



COMBAT

Salerno, Anzio, and Omaha Beach, 1943–44

US Soldier

VERSUS

German Soldier

Chris McNab



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Illustrated by Steve Noon

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Introduction

To a large extent, the outcome of World War II depended on amphibious landings. Without the ability to put masses of troops, vehicles, and equipment on contested shores, and to establish exploitable beachheads there, the Western Allies would not have been able to reclaim conquered territories in the Pacific, North Africa, and Western Europe. In short, without amphibious landings much of the conflict would have remained in stalemate, rather than Allied victory.

In this fact there is some cause for disquiet, because amphibious landings rank among the most challenging of military operations, with highly uncertain outcomes. Consider the perils and problems facing Allied amphibious forces embarking on any landing operation. They first had to find suitable landing zones, ones that were not only hydrographically and geographically amenable to putting ashore tens of thousands of troops, but which could also cope with the endless conveyor-belt of logistics that would roll in subsequently to sustain the offensive momentum. Then the planners and commanders not only had to devise ways to keep the landing location secret from the enemy – not easy when you are putting together a vast naval, air, and land force (total troops put ashore in Normandy on June 6, 1944 numbered 156,000) – but also how to overcome the defenses the enemy had in place along the landing zone, defenses that were often purposely and intelligently devised to prevent just the sort of amphibious landing the planners were intending. To deliver the invasion, the elements of the landing force had to be transported effectively by naval assets from their home bases to the staging waters just offshore, then from that position to shoreline, all to schedule. Troops had to hit the beaches with enough firepower and momentum to overcome shoreline and beachhead resistance, even as waves of subsequent landing forces piled onto the beach, threatening organizational chaos. Now came one of the most complex factors of an amphibious landing: logistics. The “combat loading” of supplies aboard the landing craft had to be intelligently ordered to meet the evolving tactical needs of the troops ashore, and the efficiency of offloading and storage had



to be of clockwork precision. All this was conducted in the teeth of the active resistance of the enemy, who would bring all the firepower assets they had – from major coastal artillery pieces to automatic small arms – to bear on a relatively small patch of land choked with a wealth of target opportunities.

Given these challenges, it is little short of remarkable that all the major Allied amphibious invasions in Europe were successful. (Dieppe, on August 19, 1942, could be viewed as an exception, but that action was a raid rather than an invasion.) This outcome is indicative of the fact that although the defenders against amphibious assault were certainly in a theoretically strong position, there was also much weighted against them. For a start, the invaders would conduct exhaustive pre-invasion reconnaissance and planning, identifying all defenses and working out exactly how to overcome them with every firepower asset at their disposal. The defenders would also, typically, be numerically inferior to the landing forces; given the breadth of Germany's operational commitments, particularly on the Eastern Front, it was impossible to keep huge numbers of men tied up and inactive in coastal positions, just on the off-chance of a landing. Therefore, Germany's coastal defense policy was, by and large, made up of two strands: first, to establish physical coastal defenses that could be manned by limited numbers of troops (the Atlantic Wall system is the most significant expression of this policy); and second, to retain mobile forces inland that could react to identified landings, and deploy them rapidly to the landing area to quash the beachhead buildup.

In this book, we will see both strands of German coastal defense policy in action, and equally their failure. At the same time, we will also see the strengths and weaknesses of Allied amphibious warfare tactics under a harsh spotlight. Amphibious landings, indeed any military operation, always have a significant degree of disorder or "friction," and in the battles explored here, we see the human consequences of this chaos, often bloodily expressed on the shoreline.

Accordingly, we will study the front-line combat in three major amphibious actions: Operation *Avalanche* – the invasion of mainland Italy at Salerno on September 9, 1943; Operation *Shingle* – the subsequent landings in Italy at Anzio on January 22, 1944; and Operation *Neptune/Overlord* – specifically, the Omaha Beach landings on June 6, 1944, as part of the Allied invasion of

June 1944: German coastal batteries fire on Allied forces landing in Normandy in the area at the mouth of the Orne River. This photograph shows the typical combination of defenses around the Normandy landing zones, with intensive tiers of beach obstacles overlooked by multiple firing positions and strongpoints in the bluffs and cliffs above. (ullstein bild/ ullstein bild via Getty Images)

Major Allied amphibious actions, March 1942–August 1944

MAP KEY

- 1 March 28, 1942:** Operation *Chariot* – British amphibious Commando raid against the German dry dock at Saint-Nazaire, France.
- 2 August 19, 1942:** Operation *Jubilee* – Allied (predominantly Canadian) amphibious raid against the German-occupied port of Dieppe, France.
- 3 November 8–16, 1942:** Operation *Torch* – major Anglo-American invasion of French North Africa, opening a second front and providing a steppingstone to the later invasion of southern Europe.
- 4 July 9–10, 1943:** Operation *Husky* – Allied (mainly Anglo-American) invasion of Sicily, opening a new front in southern Europe and a jumping-off point for the invasion of mainland Italy.
- 5 September 3, 1943:** Operation *Baytown* – British and Canadian invasion of the southern “toe” of Italy, as part of wider Allied invasions of mainland Italy and an effort to draw German forces away from Operation *Avalanche*.
- 6 September 9, 1943:** Operation *Avalanche* – major Allied amphibious landing south of Naples in the Gulf of Salerno, designed to seize Naples farther north and to trap German forces in the south of Italy.
- 7 September 9, 1943:** Operation *Slapstick* – British amphibious landing around Taranto, aimed at seizing the ports of Taranto and Brindisi and providing another foothold in southern Italy for Allied troops.
- 8 January 22, 1944:** Operation *Shingle* – Allied amphibious landing around Anzio and Nettuno in western Italy, intended to outflank German defensive lines inland.
- 9 June 6, 1944:** Operation *Neptune/Overlord* – Allied invasion of German-occupied France along the beaches of Normandy; opening of the Second Front in Western Europe.
- 10 August 15, 1944:** Operation *Dragon* – Allied invasion of southern France between Toulon and Cannes, intended to seize control of key French Mediterranean ports and to apply further pressure upon German forces in France.

Normandy. All these actions have been studied extensively in other Osprey publications, especially the respective Campaign titles. Here, therefore, we will narrow our focus tactically. From the US side, our principal attention is on the US Army’s combat engineers. The role of combat engineers in an amphibious landing was crucial. Not only were they largely responsible for clearing the major enemy beach defenses (a task that required them to be in the very first waves of the assault landings), but they would also have to perform a daunting range of tactical and logistical tasks thereafter, from laying beach roads to managing casualty evacuation. Without the combat engineers, amphibious landings would scarcely have been possible.

On the German side, our focus is somewhat broader, as the composition of the defensive forces changed according to each location studied. Thus we will explore the tactical responses and combat experience of those infantrymen, artillerymen, airborne soldiers, *Panzer Grenadiere* (mechanized infantry), or Panzer troops either manning coastal positions or channeled into the bridgehead defense as the amphibious landings unfolded, and who came into conflict with the US Army combat engineers. What we shall see in all three battles are two sides locked in a race against time. For the combat engineers, the clock was ticking to clear the enemy defenses on the beach or just inland, and to help the assaulting infantry establish defensible lines both logistically and tactically before the gathering enemy storm could overwhelm them. For the defenders, their race was to drive men and armor toward the beachhead faster than the enemy could build up their logistical foundations, and then to drive the enemy forces back into the sea.



The Opposing Sides

ROLES AND DOCTRINE

American

The range of roles for which US Army engineers might be tasked in World War II was prodigious, reflecting both battlefield requirements and the eventual scale of the conflict that developed. General duties included: map production; bridge, road, and rail construction; river crossing (pontoon or boat); establishing water supplies and sanitation; vehicle maintenance; electrical engineering work; transportation and delivery of POL (Petroleum, Oil Lubricants); ammunition supply and supply dump maintenance; structure building (barracks, depots, etc.); airfield construction; and rubble/obstruction clearance. When we expand the analysis to include amphibious roles and responsibilities, however, the importance of engineers to a successful amphibious landing quickly becomes clear. The following is a list of engineer duties for amphibious landings in the 1941 War Department manual FM 31-5 *Landing Operations on Hostile Shores*:

Duties particularly applicable in a landing operation include –

1. Assistance to beach party in removal of underwater obstructions at the beach, construction and maintenance of improvised landings and temporary wharves, and in the landing of heavy material.
2. Repair, construction, and maintenance of traffic routes from the water's edge to combat units and, if necessary, assistance in the movement of heavy vehicles.
3. Demolition of enemy obstacles on shore.
4. Creation in front of the beachhead line of a barrier of demolitions, mine fields, and other obstructions to protect landing operations from mechanized raids.
5. Construction, shelter, and camouflage of important rear area establishments.

6. Construction and maintenance of facilities for the reception, storage, and purification of water, the development of water supply ashore, and the organization and maintenance of water distributing points.
7. Construction of landing fields for aviation.
8. Furnishing technical assistance, and provision and distribution of tools and material for the construction of defensive positions, artillery positions, and command and observation posts.
9. Construction of bomb shelters.
10. Operation of existing railways and other public utilities.
11. Development of additional landing facilities. (War Department 1941: 165–66)

In this list the breadth of engineering roles is apparent. Slightly more hidden is the fact that many of these roles (e.g. 2. and 3.) would place the engineers in the very forefront of the fighting. Here was the realm of the combat engineer, an engineer specifically trained to work and fight alongside other front-line tactical forces. Commonly, a combat-engineer battalion would be attached to a specific infantry or airborne division during an amphibious landing, specifically for duties such as mine clearance (or, later, mine-laying), stronghold demolition, creating defensible field positions, managing casualty evacuation, road-laying, artillery emplacement, supporting vehicle landings, and even antitank warfare. The combat engineer would also find himself, on occasions (as we shall see), utilized as conventional infantry, albeit infantry with a set of additional useful skills.

Sound tactical doctrine for the engineers in relation to amphibious warfare, and for the US forces in general, was a relative latecomer, and made more problematic by interservice rivalry and confusion about who was responsible for tactical control up to and on the shoreline. Prior to the Japanese attack on Pearl Harbor on December 7, 1941, there were some official US manuals that addressed amphibious joint operations, particularly the US Navy's *Landing Operations Doctrine*, FTP 167 (1938) and the aforementioned *Landing Operations on Hostile Shores* (1941), but the practical expression of this doctrine was poor in terms of training and operational clarity. A primary doctrinal issue was the division between the US Marine Corps and US Navy concentration on



US Army engineers conduct minesweeping operations. Note how they give particular focus to the edges of the road, where looser soil provides easier opportunities for burying and concealing mines. (Margaret Bourke-White/The LIFE Picture Collection/Getty Images)



4 A US combat engineer, a member of the Gap Assault Teams (GATs) assigned to Easy Red sector of Omaha Beach, rushes up the shoreline to perform demolition duties against beach obstacles. His primary objective is to blow beach obstacles preventing the further landing of armor and landing craft, clearing emplaced mines in the process, and also to demolish perimeter defenses and strongpoints in the E-1 Saint-Laurent Draw.

Omaha Beach, June 6, 1944



Weapons, dress, and equipment

Weighing 9.5lb, the engineer's .30-caliber M1 Garand rifle (1) is shouldered, to free his hands to set demolition charges: on his left hip is the M1 demolition charge haversack (2), which held eight 2½lb M1 tetrytol charges, enough to demolish a hefty iron beach obstacle or blow apart a ferro-concrete strongpoint. Clutched in his right hand are two 100ft spools of detcord (3), for linking independent explosive charges together for simultaneous detonation.

This soldier is wearing the herringbone twill (HBT) uniform (4) typical of soldiers of 1944, worn over an M1941 jacket and olive-drab trousers as an antigas precaution. The ankles of his trousers are wrapped in tall lace-up canvas gaiters (5), which sit on the top of his

service footwear (6). His head is protected by the M1 steel helmet (7), here fitted with a mesh for attaching camouflage.

Other practical kit worn here includes: the M1938 wire cutters (8), primarily used to snip through barbed-wire defenses, carried in the pouch over his front left hip; a 1944-issue pick mattock on his right hip (9), the head detached and worn in the separate canvas bag by the side of the haft; and the standard M1943 entrenching tool (10), fitted directly into his M1928 haversack (11). Two items of note specific to D-Day are the M5 assault gasmask bag on his chest (12) and the gas brassard worn on his right arm (13), which was intended to change color if gas were detected in the air. M1 Garand ammunition pouches are worn on the belt kit (14).

amphibious landings as a means of establishing limited and localized coastal/island bases (as characterized by the Pacific War) and the US Army's belief that amphibious operations were primary actions for establishing continental footholds that opened the door to major overland offensives. Simplifying greatly, we might say that the US Marine Corps and the US Navy saw amphibious doctrine more tactically, whereas the US Army viewed the issue operationally and strategically. There were also arguments between the US Army and US Navy over who was responsible for shore-to-shore and ship-to-shore amphibious planning and delivery. Over time, these matters were largely clarified by giving the US Navy command up to the shoreline, and the US Army control once on the beach, but there remained some areas of overlap, as we shall see.

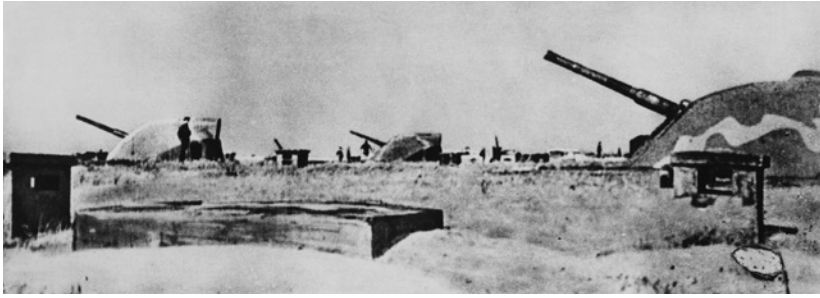
The pressures of a real shooting war started to clarify the situation in 1942–43, and the US Army began to formulate a clearer amphibious policy. The engineers were central to this shift. In June 1942, the Engineer Amphibian Command (EAC) was established at Camp Edwards, Massachusetts, tasked with developing boat regiments and boat supporting battalions specifically to operate LCV (Landing Craft, Vehicle), LCVP (Landing Craft, Vehicle, Personnel) and LCM (Landing Craft, Mechanized) boats. Shortly thereafter, the EAC also established Engineer Amphibian Brigades (EABs), each consisting of two regiments – one boat regiment and one shore regiment, each of three battalions – which had the capability of supporting a divisional amphibious maneuver up to and beyond the shoreline, with a boat and a shore company integrated into a Regimental Combat Team (RCTs) (Greenwood 1993: 6). The EABs, renamed Engineer Special Brigades (ESBs) in 1943, began a steady expansion in US combat-engineer amphibious warfare training and doctrinal development. An official history of the 5th ESB (1945; declassified in 1967) provides a useful summary of military amphibious-engineer doctrine as: “To establish, develop, and operate the beachhead beginning with the very earliest stages of the assault and concluding with the relinquishment of those duties to communications zone troops” (5th ESB 1945: v).

German

In 1943, the US Military Intelligence Division published a lengthy work entitled *German Doctrine of the Stabilized Front*. One of its early conclusions about German defenses is both accurate and applicable to the battles studied in this book:

The Germans regard economy of force as the fundamental rule to be observed in planning zones of permanent fortifications. Their aim is to achieve an effective defense with a minimum of manpower so that the bulk of the field armies will be left mobile and free for offensive action elsewhere. In other words, a very small portion of the nation's military strength or of its training effort is allocated specifically to the permanent defenses, and even the troops that are assigned to fortifications receive the same tactical training as the troops in the field armies. (US Military Intelligence Division 1943: 2)

The contrasting, and to a certain degree flawed, German policy of coastal defense is reflected in the Salerno, Anzio, and Normandy landings. Neither Salerno nor Anzio had much in the way of formal coastal defenses; indeed, at Anzio the



A view of some of the long-range coastal artillery batteries of the Atlantic Wall, facing out across the English Channel in early 1944. (Keystone/Hulton Archive/Getty Images)

initial landings were scarcely contested at all. Much of the German defense relied upon, first, indirect artillery fire from field artillery units brought forward and sometimes direct fire from guns or tanks on high ground overlooking the battlefield. The second act of defense was to amass armored and mechanized battlegroups to conduct counterattacks against the vulnerable forces.

In Normandy, by contrast, the German defenders occupied a highly developed screen of coastal defenses, consisting of the artillery positions, emplacements, strongpoints, minefields, beach obstacles, and other barriers that formed the Atlantic Wall. Yet even here, the tensions in German coastal defense doctrine were exposed. Generalfeldmarschall Erwin Rommel was, from late 1943, responsible for both Heeresgruppe B (Army Group B) in Normandy and for Atlantic Wall development. He famously argued that German armored forces should be brought up close to the potential landing beaches of Normandy, so that they could almost immediately counter an amphibious invasion at the shore. Yet this doctrine was opposed by several other high-ranking German figures, including Generalfeldmarschall Gerd von Rundstedt, the Oberbefehlshaber West (Commander-in-Chief West). Thus Rommel's armor was retained inland as a mobile reserve, to be channeled to the point of threat as it was identified, with all the time delays that policy implied.

For the front-line German troops, therefore, coastal defense meant different things to different units. For those manning properly emplaced coastal defenses – typically either Kriegsmarine (German Navy) artillery personnel or Heer (Army) artillery and infantry – the priority was to deliver as much defensive firepower as possible against the landing forces, hitting them hard even as they struggled to find a foothold amid beach obstacles and mines. The artillery would also try to strike at approaching landing craft. A critical objective was to try to prevent the Allied forces from getting significant amounts of armor ashore, disgorged from the heavier landing craft; once the enemy had armor on the beaches, they were better placed to knock out emplacements and to make a drive inland.

In the case of mobile troops in the interior, they would generally seek first to establish elevated observation posts overlooking the landing site, from which artillery could be directed, and then to find or construct positions from which to deliver direct fire. The defenders would then move armored and mechanized battlegroups up to the beachhead as quickly as possible, hoping to overwhelm the attackers with superior offensive force before the beachhead could develop, and if necessary, create defensive positions a little farther inland, on which the Allied advance off the beachhead would break.



This German infantryman stands and takes aim with his submachine gun at Omaha Beach on June 6, 1944, defending against the movement of US troops up the bluffs behind the sand. He is a veteran of campaigns on the Eastern Front in 1941–43, one of the experienced soldiers mixed into the fresh-faced recruits during the formation of 352. Infanterie-Division in November 1943, to bolster the combat-effectiveness of the division.

Omaha Beach, June 6, 1944



Weapons, dress, and equipment

This soldier is armed with a 9×19mm MP 40 submachine gun (1). The MP 40 had an effective range of only about 100yd; total unloaded weight for the weapon was 8.82lb.

The soldier's standard field-grey combat uniform is mostly covered by his Zeltbahn 31 shelter-quarter (2), here worn as a camouflage smock, although his M43 field tunic (3) and trousers (4) are still visible, the latter tucked into M41 canvas anklets (5). The camouflage pattern on the shelter-quarter was known as Heeres-Splittermuster 31 (Army Splinter Pattern 31), and the fabric (called *Makostoff*) was fully water-repellent, so the shelter-quarter made

an excellent improvised rain poncho. Rather than wearing the impractical jackboots, he has combat ankle boots (6).

He is wearing light kit, typical of soldiers fighting from fixed defensive positions (heavier kit could be left behind in trenches, strongpoints, or other positions). The ammunition supply for his MP 40 is provided by the belt-mounted pouches (7), each of the six pouches holding an individual 32-round box magazine. Also visible is the metal gasmask canister (8), by this stage of the war often holding supplies and personal items, rather than the gasmask; the M31 bread bag (9), possibly holding grenades; and the M31 water canteen (10).

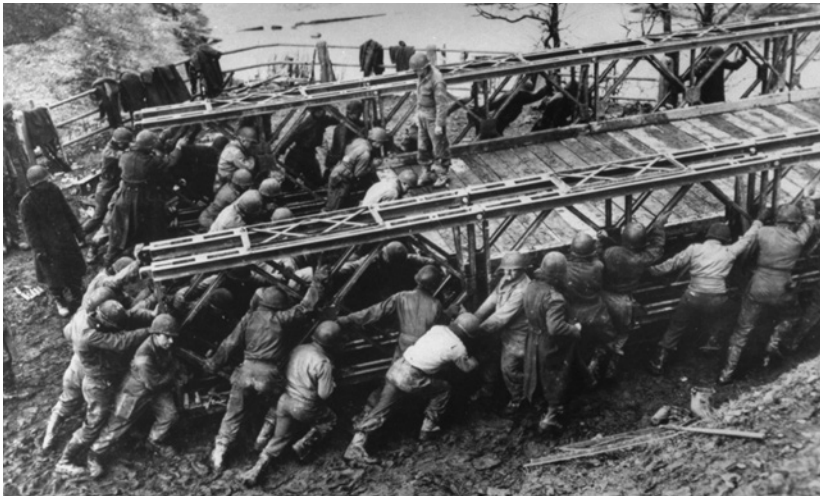
TRAINING AND EXPERIENCE

American

Given the massive expansion of the US Army in 1942–43, and the ever-increasing reliance upon engineers as combat-support troops, it was near inevitable that the engineers would include a high percentage of “green” troops during the operations at Salerno, Anzio, and Omaha Beach. In September 1942 a new US troop composition plan for the European Theater of Operations (ETO) was developed, based on a total of 427,000 troops. Of this figure, 45,000 – 10.5 percent of the force – were meant to be engineers, ambitious given that on July 1, 1942, the total engineer contingent in the ETO was just 2,150. This figure admittedly rose to 40,000 men in November 1942, but then more than 18,500 of these were deployed to North Africa between November 1942 and January 1943 for Operation *Torch*, the Anglo-American landings in French Morocco and Algeria (Beck et al. 1985: 37). This split the engineers between the ETO and the Mediterranean Theater of Operations (MTO), complicating both training regimes and also stretching the resources between the two theaters.

The expansion of the engineers meant that in many cases the pool of actual engineering talent could be low, as people with little practical engineering experience were incorporated into the forces. (For more about the general recruiting conditions of a US Army engineer, see Rottman 2010.) A report from the Engineer Replacement Training Center (ERTC) at Fort Belvoir, Virginia, in March 1942 reported that of 3,050 men in that organization, only 52 actually had a year or more of studying engineering or a related science. The problem also extended significantly to officers, as the recruiters found it difficult to source those with advanced qualifications. Again in March 1942, the Engineer Officer Candidate School (EOCS) – the engineer equivalent of the Army OCS – found that only about 6 percent of the college graduates had degrees in engineering. Although a college degree was not necessarily the stamp of a good combat engineer, it was still the case that the 12 weeks’ training intended to turn out an engineer officer was insufficient for someone without the appropriate technical background. New measures to tackle this shortage were introduced during 1942 and 1943, including accepting more men without college qualifications and training them up to standard, drawing men from other branches of the armed services into engineering, and, five weeks into EOCS, giving an extra two weeks of training to those who struggled with the instruction, after which they were either accepted back into EOCS or rejected from the engineers. Gradually the pool of officers grew to meet the demands of operations, and the quality of training improved, so that by early 1943 more than 80 percent of those who entered EOCS graduated (Coll et al. 1988: 155).

In terms of amphibious training, general engineers would receive some instruction as part of basic training and in-unit training. For combat engineers in EABs/ESBs, however, the amphibious element was naturally far more accentuated. Amphibious training was provided via exercises in both the United States and, when deployed to the ETO, in the United Kingdom. For those engineers in the MTO, there were rehearsal exercises prior to most major landings, such as Operations *Torch* and *Husky* (the invasion of Sicily).



Bridge-laying was a major area of responsibility for the US Army's engineers. Here a group of engineers use sheer muscle power to shove a complete Bailey Bridge into place across a river valley. The Bailey Bridge had been specifically designed to be liftable by muscle power alone if necessary. (Time Life Pictures/US Army/National Archives/The LIFE Picture Collection/Getty Images)

There was investment not only in the skills of boat handling and obstacle demolition, but also in demining, a skill that needed many hours of practice to reinforce.

The history of the 5th ESB provides some illumination as to the nature of the engineer amphibious training. For example, during the approach to the Normandy landings, US Army engineers in the United Kingdom conducted major exercises on the beaches of South Wales in January–April 1944. The history describes the efforts to inculcate realism:

The terrain and beach conditions of the Gower Coast, especially at Oxwich Bay, closely resembled those to be encountered later by the troops of the Brigade, upon landing in Normandy, France. Every effort was further made to promote realism in conducting landings and operations on the beaches selected. Thus, prior to each exercise, beach obstacles were set up and the dunes were planted with mines and activated booby traps; pillboxes and concrete blocks were also constructed and attacked with rifle grenades and rocket launchers during assault landings. (5th ESB 1945: 28)

Similar strategies were practiced in the MTO. Prior to Operation *Husky*, for example, the 1st ESB spent two-and-one-half months rehearsing landings with the US Navy, and especially getting familiar with the new DUKW amphibious truck that was now starting to appear in theater.

Operations such as *Torch* and *Husky* meant that by the time of Salerno and Anzio, the US Army's engineers had a significant body of combat-proven troops. Yet the casualties suffered by many engineer units in the MTO meant that there was some depletion of this experience. A letter from Brigadier General (ret.) George W. Gardes of the VI Corps Combat Engineers after the war illustrates this problem during the preparations for the Salerno action:

The morale of the 36th was high when it returned to Biserte. As a result of nearly a year's operations in North Africa and Sicily, we had developed a cohesive, close knit, capable organization with a number of very fine Non-Coms. However, it was at reduced strength as a result of losses in Sicily from battle casualties, sickness and

US Army engineers in Italy use an excavator to clear rubble caused by retreating German demolition teams. The barrage balloons tethered above the work provide a limited measure of defense against German aerial ground-attack sorties. (Margaret Bourke-White/The LIFE Picture Collection/Getty Images)



injuries. We were over two hundred men under strength and averaged only slightly more than two officers per letter company. In addition to our personnel shortage, much of the organizational equipment was in need of replacement or extensive overhaul as a result of hard usage and casualties from mines, bombs and shell fire on the beaches and during subsequent operations in Sicily. (Gardes 1959: 3)

This pattern of strength depletion was common throughout the MTO engineers, and was a reality that required adaptation and the steep learning curve of subsequent combat experience.

German

The German forces in World War II were for the most part extremely well trained when compared to the Allies, a trend that continued up to the very final months of the war. On top of the paramilitary training pre-enlistment Germans received in organizations such as the Hitlerjugend (Hitler Youth), Wehrmacht basic training average about 16 weeks, only dropping to 12–14 weeks from 1944. (Typical basic training for US infantry for most of the wartime period was 13 weeks.) Among the Panzer crews, the training period was 21 weeks (15–17 weeks for US armor crews), the only contraction being that from late 1944 trainees might be expected to go into combat after 16 weeks of training.

In relation to the operations covered in this book, the great strength of the German forces in Italy and on Omaha Beach was the combat experience they brought to bear. In Italy, for example, the front-line troops had the reassurance of commanders who had fought and proven themselves on the front lines of both world wars, including Generalfeldmarschall Albert Kesselring (OB Süd), Generaloberst Heinrich von Vietinghoff (10. Armee), General der Panzertruppe Hermann Balck (XIV. Panzerkorps), and General der Panzertruppe Traugott Herr (LXXXVI. Panzerkorps). Such commanders overshadowed the commanders of the opposing Allied armies in terms of experience.

Among the enlisted men, there was also a high degree of combat experience, although this depended on the date the unit was established



An 8.8cm FlaK battery overlooking the Salerno landings. The great strength of the "Flak 88" gun was its versatility, being used equally as field gun, antitank gun, and antiaircraft gun. (Archiv Gerstenberg/ullstein bild via Getty Images)

and the levels of casualties they had sustained in previous campaigns. For example, 15. Panzergrenadier-Division, part of XIV. Panzerkorps at Salerno, was in many ways a new formation, having been created in July 1943 on Sicily, where it fought its first action against Operation *Husky*. Yet at the heart of the division were the remnants of 15. Panzer-Division, which had fought in the invasion of France in May 1940 and had then been in near-constant action in North Africa between 1941 and 1943. The heavy attrition of this fighting gutted the division, but the survivors formed a highly experienced cadre within the new 15. Panzergrenadier-Division. Other divisions had similar stories. Created in November 1940, 16. Panzer-Division had fought extensively on the Eastern Front between 1941 and 1943. It was finally obliterated at Stalingrad, but again, a cadre of veterans survived to form the new division in Italy, which proved itself a stubborn and aggressive formation. The German forces around Salerno and



A German *Obergefreiter* trains his Scherenfernrohr SF 14Z Gi binocular periscope/rangefinder on the Normandy beaches from the balcony of a villa, 1944. Widening the tubular lens "ears" provided the user with greater depth perception through stereoscopic vision. (Galerie Bilderwelt/Getty Images)

Anzio also had some highly experienced Luftwaffe formations, including the elite 4. Fallschirmjäger-Division (Parachute Division) and the respected Fallschirm-Panzer-Division *Hermann Göring*. Although the latter's title was only given in Sicily in 1943, the unit's regimental-, brigade-, and divisional-strength predecessors had been in action since the 1930s, fighting in Western Europe, on the Eastern Front, and in North Africa.

At Omaha Beach in Normandy, the picture of experience was a little more mixed. The main force that resisted the Allied landings there, 352. Infanterie-Division, was a "Type 44" formation, meaning that it was formed from cadres of units wiped out on the Eastern Front (in this case 321. Infanterie-Division) plus new recruits from the 1925/26 pool and a number of "Hiwis" (Russian volunteers). After the war, the chief-of-staff of 352. Infanterie-Division, Oberstleutnant Fritz Ziegelmann, told US interrogators that approximately 50 percent of his officers had no combat experience and that the training of the new recruits was both elementary and late – by March 1944, the men had only thrown two hand grenades each and had undertaken just three live-fire exercises. Furthermore, many of the teenage recruits were actually almost physically unfit for combat duty, owing to the effects of food shortages back in Germany. Yet the fact remained that the division was, by the time of the D-Day landings, at full strength, and with additional training, the advantages of the strongpoint positions, plus the presence of men who had fought in previous campaigns, it was still a respected formation.

TACTICS AND LOGISTICS

American

During amphibious landings, combat-engineer battalions were attached to assault divisions or RCTs, typically on a ratio of one engineer battalion per larger formation. From a tactical standpoint, engineer commanders typically broke amphibious operations down into three sequential phases. The first was the Assault Phase, in which the engineer troops would participate in the direct assault of the beach alongside accompanying infantry. As this phase of the attack would primarily consist of small-unit actions, the engineer company was the primary command unit. The second was the Initial Dump Phase, during which logistics to support the continuing development of the beachhead were brought ashore. Logistical priorities for landing included ammunition, water, artillery pieces, armor, and fuel. At this stage of the assault, the engineer troops would now be under battalion-level command and control. The third was the Beach Maintenance Area Phase: as the beachhead was consolidated, the engineers (combat and specialist types) now worked to develop the landing area as a more substantial base of operations, including constructing the facilities and infrastructure required to enable defense of the beachhead plus offensive movement inland. By this stage, command and control had passed up to brigade level.

The tactical demands of combat engineers were, as we have seen, diverse, and depended on the nature of the objective on which they had landed. The history of the 5th ESB (created specifically for the Normandy landings)



describes the purpose of the Engineer Combat Battalion (ECB) as performing “all Engineer work on the beach and in the Beach Maintenance Area assigned the Brigade, in order to facilitate debarkation, unloading of supplies, transporting supplies to camp, and evacuation of wounded and prisoners of war, also provides local security” (5th ESB 1945: 23). The tactical remit here extends across all the three phases of amphibious operations described

American DUKW amphibious vehicles head out to unload cargo from a Liberty ship waiting offshore during the landings at Anzio. (George Silk/The LIFE Picture Collection/Getty Images)

above. During the Assault Phase, however, the main priorities would be first to remove obstacles and defensive barriers (barbed wire, tank traps, boat traps, minefields, etc.) in the assigned landing areas, typically a demolition task. If particular obstacles could not be removed in the time allocated, they would be marked as hazards for additional landing craft to avoid. The demolition skills of the engineers would also be useful for assisting infantry in direct assault on enemy strongpoints, and on many occasions the immediate tactical demands of the Assault Phase would see engineers temporarily adopting standard infantry fighting roles.

Having removed immediate obstacles to landing, the engineers would designate paths in their assigned sectors for further landing of heavier equipment and supplies; engineers would remain at the shoreline to direct the landing craft in and guide the unloading. Engineers would also clear pathways up the beach and through the exits from it. This might involve further demolitions work, but it could also require the laying of temporary vehicle surfaces, such as reinforced wire matting. There was much time pressure here. For Operation *Neptune*, for example, it was expected that the engineers would create enough beach exits within three hours of landing to facilitate the passage of 120 vehicles per hour. If tractors and bulldozers had been landed, the engineers would also use these for improvised landscaping, such as filling in antitank ditches, and also for drawing artillery pieces and vehicles up the beaches. As the Assault Phase moved into the Initial Dump Phase, the focus of the combat engineers would shift from combat to consolidation, as they worked to ensure the efficient landing of personnel and the rationalization of logistics at the beachhead.

Outlined here, the tactical objectives of the combat engineers seem relatively clear. Yet in the chaos and horror of a landing under fire, they had to be adaptable and innovative, responding to the immediate crises at hand and applying their talents to dealing with a multitude of threats and obstacles.

German

We have already outlined the different German doctrinal relationships to countering amphibious landings, and these approaches naturally governed the tactics involved. For those troops manning fixed coastal positions, the tactical priority was first and foremost to create high-density defensive barriers within the landing areas, to make the enemy landing as physically complex as possible, to inflict remote attrition, and to channel landing craft and disembarking troops into predesignated fields of fire, delivered primarily by artillery, mortars, and machine guns.

The defenses typical of the Atlantic Wall included underwater stakes – booms and steel-girder constructions designed to rip out the bottom of landing craft; these obstacles were sometimes also mined. The defenders also employed shoreline obstacles such as steel trestles and concrete blocks to impede the landing and movement of vehicles; antitank ditches and defended beach walls or promenades might also prevent the exiting of vehicles from the beach area. Barbed-wire obstacles were intended to slow and channel the advance of landing personnel. Mixed antipersonnel and antitank minefields were also used, as were infantry field positions,



including defensible trench works and firing posts. The defenders could also use reinforced ferro-concrete strongpoints, containing a variety of ordnance including medium and heavy machine guns, mortars, antitank and field artillery, and large-caliber coastal artillery; artillery pieces would also often be sited on headlands or high ground adjacent to the beach, to deliver both direct and indirect fire.

From the German defenders' point of view, the principal tactic of contesting an Allied landing against fixed coastal defenses was to attempt to gain fire superiority during the early stages of the landing, thereby disrupting the landing plan and preventing the enemy from overcoming attritional inertia and establishing a foothold on the beach. If this could be accomplished, then the landing would be unable to move beyond the Assault Phase and German reinforcements could pour into the area to drive the landing back into the sea.

In situations where the Germans were moving inland forces to an emerging beachhead, the tactical priorities were quite different. As soon as possible, the landing area would be brought under concentrated artillery fire and the fire of infantry automatic weapons. Next, the local theater commander would attempt to move armored and mechanized assets as fast as possible to the beachhead. It would take time for the enemy to build up onshore armored formations from an amphibious platform, and thus if the German units could be brought up quickly, then they could achieve a strength advantage before the Allies could build up their numerical superiority. Often, the local commander would form his infantry, artillery, mechanized, and armored units into task-specific combined-arms *Kampfgruppen* (battlegroups), and direct these to deliver forcible counterattacks at the earliest possible opportunity, thereafter maintaining the tempo of the attacks at a pace that would hopefully outstrip the Allied buildup.

Fallschirmjäger in 1944 scan for targets across the Allied positions on the Anzio/Nettuno front, ready to engage with a 3.7cm PaK 36 antitank gun. The gun's low profile made it useful for concealing in relatively shallow fighting positions. (ullstein bild/ullstein bild via Getty Images)

WEAPONS AND EQUIPMENT

American

The range of equipment used by the US Army engineers as a whole is well beyond the scope of this study, if we include all specialists, such as sanitation, vehicle maintenance, and bridge building. Here we will narrow the focus to the type of equipment typically used by the combat engineers during the Assault Phase, although during the course of our subsequent battle analysis, there will be some digressions to consider additional job-specific tools of the trade.

The basic uniform and load-carrying equipment of the combat engineer was essentially that of the general US Army infantryman, explained on page 11 (see also Rottman 2010). The combat engineer's small arms were also standard issue – most US Army engineers went into action with the .30-06 M1 Garand semi-automatic rifle; stateside, training units before 1943 often trained with the older .30-06 M1903 Springfield bolt-action rifle. The Garand was a superb combat rifle. Its semi-auto mechanism meant that small squads could easily build up fire superiority against equivalent opponents armed with bolt-action rifles, and it offered both accuracy and power over its 550yd effective range. The weapon's one downside for engineers was its weight (9.6lb); engineers were already beasts of burden, and the rifle was a further major addition to their load. Some engineers would have more manageable firearms; it was common for NCOs to have the .30 M1 Carbine or a submachine gun such as the .45 ACP Thompson M1A1, these weapons trading range and penetration against portability and (in the case of the submachine gun) short-range full-auto firepower.

US Army troops get to grips with the M1 Garand rifle in 1943. The Garand was the first standard-issue semi-automatic rifle to be distributed to any land army, and it transformed the firepower capability of the US infantryman. Using the aperture sights here, the soldiers would, with training, be able to shoot out past 300yd. (Bettmann/Getty Images)





A US assault team off the Normandy coastline prepares to head to shore and battle aboard an LCVP (Landing Craft, Vehicle, Personnel). They are all wearing assault vests, which held extra ammunition and supplies and served in place of the M1928 haversack. (Galerie Bilderwelt/Getty Images)

Combat engineers carried a variety of practical tools to facilitate their on-beach duties. Like most other infantry, they had the T-handled M1910 entrenching tool (“E-tool”), which had a fixed head and a T-shaped handle, or the later M1943, which had a head that could be folded for storage. The engineer squad would also carry, among its members, an M1910 hand axe, two M1910 pick mattocks, and sets of M1938 wire cutters with plastic- or rubber-insulated grips, allowing them to be used for cutting electrified wires. To these items, the squad could add a host of other engineering and laboring devices, including pickaxes, sledgehammers, machetes, crowbars, chainsaws (one two-man Mall Tool Company Model 6 per company), and manual and powered winches.

For mine clearance, the engineers had the usual manual tools, including mine probes and the engineer’s Mine Marking Kit – essentially a canvas bag containing 25 yellow marker flags, each bearing the word “DANGER.” For marking mines and also vehicle lanes at night, the engineers used “Radioactive Luminous Markers Type I,” small disks that used radioactive energy to glow in the dark. Engineers might also attach these to their uniforms for nighttime identification, a practice not without its risks; the official instructions for the equipment stated that: “1. As many as 3 luminous markers may be worn on the clothing indefinitely without harm to personnel. 2. One box of 24 markers must not be carried on the person for periods in excess of 8 hours in any one day.”

For mine detection, the engineers also relied upon the SCR-625 electronic mine detector, introduced in 1942. This device functioned largely like a modern metal detector, the operator wearing headphones and receiving auditory and instrumental feedback for magnetic readings. The SCR-625 had many problems, however, including fragility, lack of ability to discriminate between metallic objects, and poor detection rates depending on the soil

conditions and for mines with nonmetallic bodies. Nevertheless, it was the best the engineers had.

For demolitions duties, the engineers could draw upon a variety of explosive charges, of increasing power and contrasting explosive effects. The basic explosive charges included the following: 1lb nitrostarch (soon replaced by TNT, owing to its instability); 0.5lb TNT; 0.5lb Composition C; 1lb TNT; 2.5lb Composition C; 2.5lb M3 C2 plastic; 20lb M1 tetrytol (eight detcord-linked 2.5lb blocks in a haversack); 20lb M2 tetrytol (eight 2.5lb blocks in a haversack, without detcord); 40lb Ammonium Nitrate cratering charge.

For punching through armored or reinforced structures, the engineers could apply the directional force of shaped charges, specifically the 13lb M1 and M2, the 15lb M2A3, and the 45lb M3. For cutting barbed wire or blowing paths through minefields there were the elongated M1A1 Bangalore torpedoes; each 13lb section, which featured its own integral blasting cap, could be connected to another, to extend the length of the explosive device up to 200ft. The engineers might also improvise pole charges: explosive packs affixed to the end of a long wooden pole with Primacord, designed to insert the explosives through strongpoint embrasures while the operator stayed safely out of the line of fire.

A special demolition charge to note in the Normandy landings was the “Hagensen Pack,” developed by a Naval Combat Demolition Unit (NCDU) officer, Lieutenant Carl P. Hagensen. These were basically small sausage-shaped waterproof canvas bags filled with the new Composition C-2 plastic explosive and featuring a hook at one end (to attach the explosive to an obstacle) plus a length of Primacord. When multiple Hagensen Packs were linked together by Primacord around an obstacle, they could either destroy it or blow it over.

German

The first line of German defense against amphibious landings was provided by artillery. The types of artillery piece used depended very much on the nature of the German coastal defenses, whether fixed or mobile. The Atlantic Wall gunnery, for example, covered almost the entire spectrum of calibers and firepower, from 3.7cm SK C/30 antiaircraft and 7.5cm PaK 40 antitank guns up to brutish pieces of long-range firepower such as the 38cm SK C/34 naval gun, which had cross-Channel reach. Overlooking Omaha Beach, for example, was the Longues-sur-Mer battery, which had four rapid-firing 15cm TK C/36 marine guns; the battery also featured machine-gun strongpoints and mortar pits for close–medium-range defense of the battery.

Towed field guns or self-propelled artillery were used to enhance fixed coastal artillery or to provide the core of mobile coastal defense (as we shall see at Salerno and Anzio). In terms of field pieces, the principal types in the German arsenal were the 7.5cm Feldkanone 38, 8.8cm FlaK 18/36/37 (actually designed as an antiaircraft gun, but finding further purpose as an antitank gun and field gun), the 10.5cm IFH 18/40, 15cm FH 18, 17cm Kanone 18, and 21cm Mörser 18 howitzer. At Anzio, however, we also see some of the more unusual beasts of German firepower being brought into play, especially the 28.3cm Krupp K5 railway gun – better known as “Anzio Annie”



– which lobbed 536lb shells into the Anzio beachhead. German indirect fire against the Allies was also supplemented by infantry and *Panzergranadier* mortar crews, primarily firing the 8cm Granatwerfer 34 mortar and 21cm Nebelwerfer 42 multiple rocket launchers, the latter operated by special crews of *Nebeltruppen*.

For the German foot soldiers, the best small arms they had for coastal defense were machine guns, principally the 7.92×57mm MG 34 and MG 42. Both had high rates of fire – the MG 42 up to 1,200rd/min – and on a tripod mount with telescopic sight an effective range (indirect fire) of 3,800yd, although 2,200yd was more practical. Both weapons fulfilled the *Einheitsmaschinengewehr* (Universal Machine Gun) concept, in which one weapon could move through light, medium, and heavy machine gun roles (including antiaircraft fire) by changing the mount and feed. In terms of standard individual weapons, the German troops relied on the solid 7.92×57mm Kar 98k bolt-action rifle, the 9×19mm MP 40 submachine gun (usually handled by NCOs and squad leaders), and limited numbers of newer “assault”-type automatic rifles, including the 7.92×33mm MP 43/44/StG 44 and (in *Fallschirmjäger* hands) the 7.92×57mm FG 42. The StG 44 and FG 42 were two of the most important small-arms developments of World War II, and gave an ability to generate fire every bit as potent as that from the Americans’ M1 Garands. For heavier firepower, the Germans also utilized 2cm and 3.7cm FlaK cannon, developed for antiaircraft use but, often on multiple wheeled mounts, equally useful for ground fire when their barrels were depressed.

Another critical tool of German coastal defense was the mine. Mines were separated into antipersonnel and antitank varieties; the minefields

A 21cm Nebelwerfer 42 team prepares to fire upon Allied troops in Normandy. The multiple rocket launcher fired six Wurfgrate 42 shells to a range in excess of 7,500yd. (ullstein bild/ullstein bild via Getty Images)



The PzKpfw VI Tiger Ausf E was one of the heaviest tanks in the German arsenal in 1942–45. Its armor was impervious to many Allied tank and antitank guns, while its 8.8cm KwK 36 L/56 high-velocity main gun could wreck every armored opponent with a single hit. (Arthur Grimm/ullstein bild via Getty Images)

typically combined both in “mixed pattern” fields. Of the antipersonnel types, the most common were the S-mine (Schrappnellmine) and the Schu-Mine 42 (Shoe-mine). The former was known as the “Bouncing Betty” by the Allies, on account of the fact that, when triggered, it was propelled about 3ft out of the ground by a black-powder propelling charge before detonating and spraying out lethal fragments at torso height. The Schu-Mine 42 was little more than a rectangular wooden box with a hinged lid, a detonator, and 7oz of TNT, but it was quite capable of destroying a human leg. Of the antitank mines, it was the *Tellermine*-series antitank blast mines that the Allies most encountered. These typically contained around 12lb of TNT or Amatol, and were quite capable of wiping out an Allied tank or landing craft with a single detonation. For close-range or direct-fire antitank work, the German troops would rely upon handheld shaped-charge antitank launchers such as the *Panzerfaust* and *Panzerschreck* or high-velocity fire of antitank artillery guns such as the 5cm PaK 38 and 7.5cm PaK 40.

As we shall see, particularly in the case of Salerno and Anzio, the Germans also relied upon armor as a vanguard of response to an amphibious landing. By 1943, the PzKpfw IV medium tank was the main German tank in service, with a 7.5cm gun. The success of this vehicle led to the platform being repurposed for several other vehicles, including the Sturmgeschütz IV assault gun, Jagdpanzer IV tank-destroyer, and the Wirbelwind self-propelled antiaircraft gun. The heavier German tanks – the PzKpfw V Panther and the PzKpfw VI Tiger – were also, by 1943, appearing in greater numbers. They outclassed anything the Allies could field at that time, although issues with weight and reliability troubled their combat performance.

Salerno

September 9–23, 1943

BACKGROUND TO BATTLE

The Anglo-American invasion at Salerno, codenamed Operation *Avalanche*, was a seminal, but controversial, step forward in the Allied war effort. With an invasion of mainland Western Europe postponed owing to logistical, operational, and political reasons, but with pressure for a Second Front still strong, the Allies had swung north following their defeat of Germany in Tunisia in May 1943, invading and capturing Sicily in Operation *Husky* between July 9 and August 17. During this operation, Benito Mussolini's weakening grip on power finally released, as he was ousted by a coup on the night of July 24/25, replaced by Marshal Pietro Badoglio as head of Italy's government. Soon after, Badoglio and his administration began covert negotiations with the Allies, on the premise that if the Allies invaded mainland Italy then Italy itself would switch sides in the conflict. The Allies opted to follow this dangling carrot, and thus the planning for what would become Operation *Avalanche* began.

The two major formations available for the invasion of Italy were the British Eighth Army, commanded by the redoubtable but politically prickly General Bernard L. Montgomery, and the US Fifth Army (actually composed of US VI Corps and British X Corps) under the speedily promoted Lieutenant General Mark W. Clark. Together these two armies constituted the 15th Army Group, led by the British Army's General Sir Harold R.L.G. Alexander. There followed much debate about where these forces should be landed. The final decision was made in favor of a three-pronged approach. The Eighth Army would open the offensive with Operation *Baytown* on September 3, a short hop from Sicily across the Strait of Messina to begin a northerly advance up the "toe" of Italy. The main invasion landing, Operation *Avalanche*, was to be launched six

days later on September 9, the US Fifth Army landing at Salerno. The strategic intention of this landing was for the Fifth Army to create a major logistical foothold on the west coast of Italy, including a swing north to seize the port of Naples. The lodgment would enable Clark to drive his forces inland even as Montgomery pushed up from the south, squeezing the German 10. Armee into a trap and then combining armies for the drive northward on Rome. On the same day that Operation *Avalanche* went in, the British 1st Airborne Division would make a landing on the inner “heel” of Italy at Taranto, an action that would give the Allies another valuable port and add to Kesselring’s confusion about the true direction of the Anglo-American offensive.

In terms of the actual Salerno landings, and the engineers’ role in them, the landing forces were essentially divided in two, the dividing line being the Sele River that flowed out to sea through the Salerno Plain about 15 miles south of the town of Salerno. North of the river was the responsibility of Lieutenant-General Sir Richard L. McCreery’s X Corps, which would land on three sites across a 7-mile stretch of coast, its objectives being Salerno port, mountain passes to the north, Montecorvino airfield, and some key road and rail junctions. North of Salerno itself, there would also be landings by US Army Rangers and British Commandos, which were to capture and hold key mountain passes and thereby prevent German reinforcements being pressed into the area.

South of the Sele River, US VI Corps (Major General Ernest J. Dawley) would go ashore across a 3-mile stretch of coastline, landing just one of Dawley’s divisions, the 36th Infantry Division (the other being the

The commander of the US Fifth Army, Lieutenant General Mark W. Clark, offers words of encouragement to US troops who have been fighting at Salerno. Clark’s leadership during the Italian campaign remains the subject of much controversy, although his personal bravery is not open to question. (Photo12/ UIG/Getty Images)





A German Sturmgeschütz IV (StuG IV) assault gun shells Allied positions at Salerno, using the concealment provided by foliage to mask the presence of the vehicle and reduce its gun flash and dust signatures. (ullstein bild/ ullstein bild via Getty Images)

45th Infantry Division), in the initial assault owing to a shortage of landing craft. Four US landing beaches were designated: from north to south – Red, Green, Yellow, and Blue – roughly centered on the magnificent ancient Greek ruins of Paestum, just a short distance inland. The overarching objective for VI Corps was to move inland and capture vital areas of high ground, particularly the towering Monte Soprano. The strategic reserve for Operation *Avalanche* was the US 82d Airborne Division based at airfields on Sicily; the British 7th Armoured Division and the US 3d Infantry Division would also be landed within three days to consolidate the bridgehead and provide further momentum to the inland push.

In terms of the US engineer forces for the VI Corps operations, each of the two US divisions had an organic engineer battalion: the 111th ECB with the 36th Infantry Division and the 120th ECB with the 45th Infantry Division. The 36th ECR (Engineer Combat Regiment) was also in readiness as a combat reserve for the 36th Infantry Division and would find itself particularly heavily involved in the Salerno fighting from D+1. Two other important engineer units were the 531st ESR (Engineer Shore Regiment), which would go ashore during the Assault Phase, and the 540th Engineer Combat Regiment, in support of the 45th Infantry Division. D-Day was scheduled for September 9.

With the Italo-German alliance fragmenting, 10. Armee made full preparations for an Allied landing on the southern and western coasts of Italy. Although 10. Armee was suffering from shortages of some key weapons and equipment, particularly armor, it was still an extremely potent formation – and one that the Allies were underestimating. It consisted of two corps with three divisions in each. General der Panzertruppe Hermann Balck's XIV. Panzerkorps included 16. Panzer-Division, Fallschirm-Panzer-Division *Hermann Göring*, and 15. Panzergrenadier-Division, while General der Panzertruppe Traugott Herr's LXXVI. Panzerkorps included 26. Panzer-Division, 3. Panzergrenadier-Division, and 29. Panzergrenadier-Division.

Here we see two traffic-control craft moving into the Salerno beaches. Such craft would provide landing guidance to assault and logistics craft. (© CORBIS/Corbis via Getty Images)



From the German viewpoint, the big question concerned where the Allies would land. Hedging their bets, the 10. Armee divisions were distributed around southern Italy, ready to respond to emerging threats. The area around the Gulf of Salerno was particularly heavily reinforced, as it was a rather obvious choice geographically and tactically for an Allied landing. In addition, in the immediate days before the landings aerial intelligence began to hint at the area as a preferred location. Immediately around Salerno and its beaches was 16. Panzer-Division. Fallschirm-Panzer-Division *Hermann Göring* was about 30 miles to the north protecting Naples, while 15. Panzer-Division was farther north still around the Gulf of Gaeta.

The heart of the German defense plan for Salerno was to gain fire superiority over the beachhead by means of artillery and machine guns, utilizing all the advantages of the high ground just inland, and to move armored units quickly forward into the beachhead, using the temporary advantage in armor strength to contain the landing forces. The aim of the German plan was not so much the complete defeat of any Allied invasion, but rather to contain the beachhead while troops farther north could move in as reinforcements and troops farther south could advance north to avoid being trapped and encircled. Field artillery pieces ringed the Salerno Plain from the surrounding mountains (Monte Soprano provided an especially excellent artillery observation platform), and infantry and *Panzergranadier* troops had established networks of field positions just inland, heavily emplaced with machine guns and mortars; there were also batteries of 8.8cm FlaK guns within 400yd of the shoreline. The mountainous terrain inland presented the Germans with superbly defensible positions, and would constitute their fallback.

Prior to the landings, German troops had also attempted to develop Salerno's fixed defenses. The beach area between Salerno and the town of Agropoli had been mined, with Teller mines emplaced from the water's edge to about 100yd inland (US Army 1990: 15). Some tree trunks had been dug into the shoreline and mined as anti-landing-craft measures; the Germans could



Generalfeldmarschall Albert Kesselring, the commander of German forces in Italy, here illustrates why he earned the nickname "Smiling Albert." After Germany's defeat, Kesselring was tried and convicted for war crimes, but his original death sentence was commuted following protests from former British commanders. (ullstein bild/ ullstein bild via Getty Images)

also rely upon an Italian offshore minefield. There were extensive barbed-wire sections on the beach, sited so as to channel the landers into the machine gunners' fields of fire. These measures added to Salerno's defensibility, but the fixed defenses were neither complete nor entirely rigorous.

On the actual day of the landings, the German units that would immediately face the US VI Corps landings around Paestum were from 16. Panzer-Division: tanks from Panzer-Regiment 2 (Oberst Baron Arthur von Holtey) plus the main formation, *Kampfgruppe von Doering* (Oberst Berndt von Doering), which included: two companies of Panzergrenadier-Regiment 79; two companies of II./PzRgt 2, equipped with PzKpfw IV tanks; an artillery battalion from Panzer-Artillerie-Regiment 16; and a combat-engineer detachment from Panzer-Pionier-Bataillon 16.

Salerno landings and Allied advance, September 9–19, 1943

MAP KEY

- 1 0330hrs, September 9:** The US 141st and 142d RCTs land on the Salerno coastline, the 142d RCT going ashore on Red and Green beaches, the 141st RCT heading for Yellow and Blue beaches. There are two main engineering units supporting the first waves: the 111th ECB and the 531st ESR.
- 2 c.0400hrs, September 9:** Tanks of *Kampfgruppe von Doering* quickly move up toward the beachhead and begin attacking the US landing forces, two German tanks even advancing up to Blue Beach before being forced to retreat. Machine-gunners and snipers located in the ruins around Paestum also put down heavy suppressing fire on the landing zones.
- 3 0800hrs, September 9:** Overcoming German counterattacks and neutralizing the German positions around Paestum, the US RCTs (joined by the reserve 143d RCT) push inland and steadily drive back the German resistance. The 111th ECB, 531st ESR, and 337th EGSR help to consolidate beachhead logistics.
- 4 September 10–12:** The 36th ECR is landed and advances up against German positions along the Sele and Calore rivers, conducting reconnaissance, localized counterattacks, and stopping German attempts to push armor across the rivers.
- 5 September 10–12:** The 142d and 143d RCTs drive north-east through Albanella toward Altavilla and the nearby Hill 424 (an important artillery observation post for the Germans), meeting strong resistance all the way.
- 6 September 12:** II./PzGrRgt 15 makes a counterattack against the US positions forming around Altavilla and Hill 424, forcing US troops off Hill 424. The Americans struggle to retain their grip on the area; subsequent German counterattacks by multiple *Kampfgruppen* threaten the northern sector of the US line.
- 7 September 13–17:** The 2/36th ECR, less Co. D, is deployed to support the RCTs fighting around Altavilla, the engineers being used heavily in both the infantry and antitank roles. Altavilla changes hands several times on September 13, but from September 14 it remains in German control until it is finally cleared on September 17 by an assault from troops of the 82d Airborne Division.
- 8 September 17–19:** The US troops, including the 36th ECR, plus heavy reinforcements, steadily manage to turn back the German penetrations, and on September 19 Persano is captured by US forces.

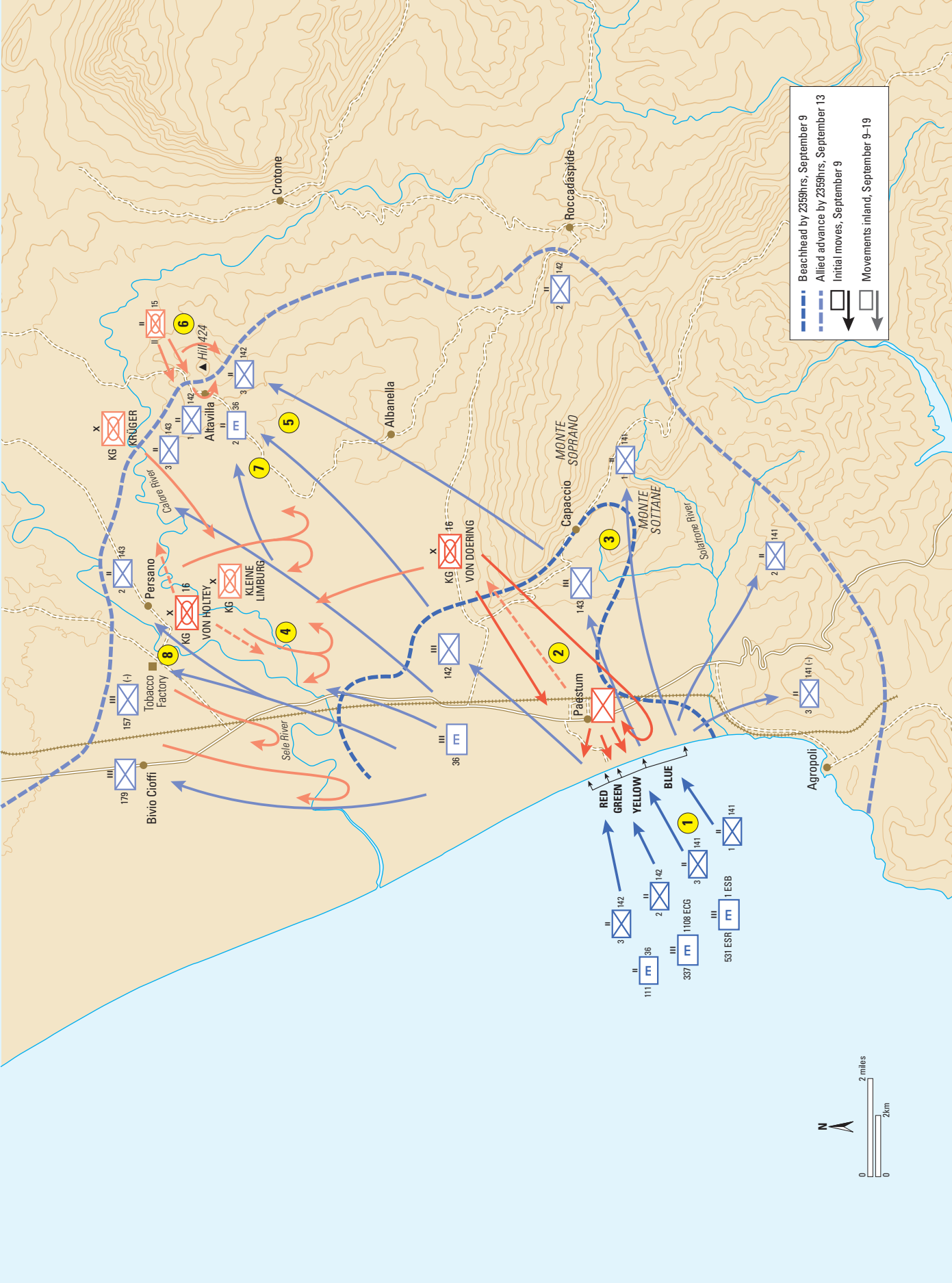
Battlefield environment

The Salerno Plain offered several advantages for those delivering an amphibious landing. For 26 miles south of Salerno port, there are wide and flat sand beaches, the shore having a shallow offshore gradient and limited surf, all of which made the beaches suitable for taking landing craft close in and disembarking troops and vehicles. Just beyond the beach was an extensive road network, ideal for facilitating movement out of the beachhead area. Several rivers – from north to south the Picentino, Tusciano, Sele, and Calore – bisected the plain and restricted north–south movement somewhat, although there were several fording areas. From the defenders' point of view, the flat expanse of beach was bordered by scrubby sand dunes, these providing some cover and

concealment for establishing defensible positions. (Sand dunes will also soak up bullets and shells admirably.) Farther inland, the landscape included many copses, orchards, ditches, and small buildings, all offering small-unit defensible positions; but most useful of all to the defenders was the chain of mountains and hills that ringed the plain in a horseshoe shape just a few miles inland from the beach. The two dominating high points of this chain were Monte Eboli in the north and Monte Soprano overlooking the Paestum beaches, the latter mountain having an elevation of more than 3,000ft. The foothills of these mountains and other landmarks were a perfect environment in which the Germans could establish defensive and artillery positions.

This image of landing craft going ashore at Salerno illustrates the tactical challenge presented by the mountainous Italian landscape just a few miles inland from the beach. The mountains in the center foreground would prove particularly useful for the Germans as artillery observation and fire platforms. (J.R. Eyerman/The LIFE Picture Collection/Getty Images)





INTO COMBAT

Having rendezvoused west of the beachhead during the nighttime hours of September 8, the invasion fleet turned toward the Gulf of Salerno. Just after midnight on September 9, troops were given instructions to transfer to the LCM and LCV landing craft that would take the first assault troops ashore. For the Paestum landing, the attack would be delivered by the 141st RCT on Yellow and Blue beaches and by the 142d RCT on Red and Green beaches. There would be three initial assault waves, separated by 7–8-minute intervals, each wave successively bringing in heavier weapons and larger numbers of personnel and infrastructure. At about 50 minutes from H-Hour, a major landing of bulldozers, self-propelled guns, 40mm anti-aircraft guns, and jeeps was to go ashore via LCMs, then about 15 minutes later reserve battalions would start to be deployed. Over the subsequent 5–6 hours, it was intended that major supplies, artillery, and armor would flow into the bridgehead as obstacles were cleared and resistance suppressed. In terms of engineer contributions, personnel of the 111th ECB would go ashore with the very first waves of assault troops to perform obstacle clearing, demining, and beachfront logistics and organization. Although the US Navy was in command of the landing craft, the US Army would take over at the shoreline.

The US forces came ashore at about 0330hrs on September 9, in darkness. There had been no preparatory naval bombardment, to retain the element of surprise. Indeed, although flashes and rumbles farther north told the Americans that the British landing was meeting resistance, the approach and landing in front of Paestum was uncontested. This was not to last, however. The Germans, observing the approaching Allied landing craft, had pulled two companies of infantry off the beach itself, but readied them in eight strongpoints just a little farther inland. Within minutes of the first US assault troops stepping ashore, the German infantry and artillery opened fire in earnest.

US troops storm ashore during Operation *Avalanche*. As the operation progressed, engineers built pontoon jetties out from the beach, which enabled further troops and supplies to be brought ashore without water immersion. (SeM Studio/Fototeca/UiG via Getty Images)





The scene suddenly descended into one of chaos. Flares, tracers, and explosions ripped apart the darkness. Infantry and engineer troops alike scattered, trying to find whatever cover they could. Veteran engineer troops focused as much as possible on trying to demolish some of the immediate beach obstacles and mark the lanes to enable the safe landing of further vehicles. At this stage of the battle, being in darkness, the Germans could scarcely distinguish engineers from infantry, but as the light improved over subsequent hours the engineers would increasingly become priority targets.

The intensification of the German fire had a particularly serious disruptive effect on the engineers' efforts as successive waves attempted to land. Landing craft were scattered or sunk on the approaches to the beach, meaning that engineer units often did not land cohesively or in the same place, reducing their ability to perform major engineering tasks. Furthermore, much of the engineers' mine-detecting equipment was lost as landing craft were sunk or equipment dropped into the water, meaning that most of the antitank and antipersonnel mines on the beach would remain active and undetected for some time yet. The situation was particularly serious around Yellow and Blue beaches, which took some of the heaviest defensive fire. The 3/531st ESR, for example, failed to land on its designated Yellow Beach during the second-wave assault, and had to divert to Blue Beach, where it managed to land only a few units. The Germans in the sand dunes around them were at their closest just 300yd away, and they poured down heavy suppressive fire from MG 42s and mortars (Beck et al. 1985: 159).

On Red and Green beaches, the situation initially looked more promising for the engineers, with the 2/531st ESR going successfully ashore with the 142d RCT. The German artillery spotted the lodgment, however, and intensified its fire on both the troops and the approaching landing craft and DUKWs. The result was that the beach could not be opened before daylight, partly because engineer construction crews could not land as units, but also because a lot of their construction and demining equipment had been lost offshore. Nevertheless, engineers still managed to make some progress in achieving their objectives. Barbed-wire obstacles were breached with Bangalore torpedoes.

US troops at Salerno flinch as German 8.8cm shells detonate nearby; one shell has just exploded out of camera view. Despite the shelling, the offloading of supplies and vehicles continued unabated. (Bettmann/Getty Images)





US combat engineers move ashore at Salerno

Troops of the 3d Battalion, 531st Engineer Shore Regiment (ESR), move up the Salerno beach as part of the second wave of Operation *Avalanche* on September 9, 1943, as daylight starts to break over the scene. The soldiers on foot are carrying a variety of demolition and combat gear that will be useful against the German defenses inland and against potential counterattacks. The man on the viewer's left has two sections of Bangalore torpedoes, ideal for cutting through deep sections of barbed wire, while the man to his side has an M1 demolition-

charge bag and detcord spool. The M1 bazooka carried by the man to the right was useful not only for antitank combat, but could also be applied to "bunker busting," its shaped charge able to penetrate reinforced concrete. The biggest piece of kit being deployed into the beach is a 40mm Bofors gun, pulled by a Caterpillar D-7, one of the key towing and utility vehicles of US Army engineers. At Salerno, these vehicles attracted very heavy fire from machine guns and artillery, with several disabled and their drivers killed.

One of the most dangerous engineer duties of Operation *Avalanche* was manning bulldozers, which were landed to perform the necessary removal of obstructions to create exit routes off the beach. As soon as the bulldozers were brought ashore, shortly after daylight, they became natural targets for enemy artillery and machine-gun fire. The very first bulldozer to move up the beach was destroyed by a direct hit from an 8.8cm artillery shell, and two more bulldozers were similarly wiped out by 1000hrs (Blumenson 1993: 84).

For a time, the Salerno landings looked precarious, but slowly US firepower began to turn the tide, and the US lodgment grew more stable. The Germans, sensing that events were turning against them, committed more than 15 PzKpfw IV tanks from Panzer-Regiment 2 (16. Panzer-Division) to a counterattack shortly after daylight, advancing down on Yellow and Blue beaches, the German force roughly equally divided between flank and center attacks. The tanks moved to relatively close range, under the protective fire of infantry MG 42 machine-gun teams. By this stage of the battle, the US troops did not have any heavy antitank weapons ashore, thus they had to improvise their defense with 40mm Bofors guns, a few field howitzers, and unit bazooka antitank rocket launchers. The engineers committed themselves to this defense alongside the infantry. On Blue Beach, for example, seven bazooka-armed engineers of Co. I, 531st Engineer Shore Regiment, helped to fight off or destroy no fewer than five PzKpfw IV tanks that pushed down into the sand dunes and were firing directly onto the beach landings. Another two 531st ESR men – Sergeant Paul B. Walsh and Sergeant Delbert L. White – also defeated two PzKpfw IV tanks in the center by firing a 40mm Bofors gun with its barrel lowered to the horizontal. The contribution of heavy offshore naval artillery fire, which with the arrival of daylight could be directed in with greater accuracy, also played a major part in quashing German counterattacks during the morning of September 9.

By mid-morning the Germans were losing their grip on the battlefield around Paestum. Their casualties were mounting significantly as the US forces built up the weight of firepower, for which they were rightly feared. German armor was being hit hard, not only by the efforts of infantry and engineers, but also by the increasing weight of artillery fire and also aerial ground-attack missions flown from airfields on Sicily. The small-unit battle was just as intense. Many German infantry positioned themselves in and around the Paestum ruins, using the ancient stones as solid sniper positions. The snipers would



target anyone of influence on the beach, not just identifiable officers but also engineer personnel engaged in combat construction work and demining. In one instance, several German sniper teams and machine guns were firing down on Green Beach from the Tower of Paestum, actually a military watchtower built in the 16th century. In response, a group of engineers from D/531st ESR went on the attack against the position, led by First Lieutenant George L. Shumaker. Although many members of the team were subsequently wounded in the attack (Shumaker himself was wounded in both arms), the Germans were eventually killed or captured in the close-range firefight.

The fighting for Salerno in the US sector would go on throughout the day, but by 1400hrs, with several German armored counterattacks reversed, the US forces began to inch off the beach and move farther inland, consolidating lines of defense and pushing the enemy farther back as they did so. The 141st and 142d RCTs established defensive perimeters on river lines, while the 143d RCT, which had been acting as a reserve, drove forward to reach the foothills of Monte Soprano by nightfall, capturing the important Hill 386 (a center of German artillery direction) by 2000hrs. During the night of September 9/10, the Germans pulled back from their positions around the beach, although it was for the purposes of regrouping and not retreating.

The US engineers were now doing more of the work for which they were intended. Lanes through minefields were being cleared or marked. Improvised roads were laid with rolls of wire mesh and wooden planking, enabling the many vehicles and artillery pieces now landing to move up and

Around the town of Salerno, two LSTs (Landing Ships, Tank) discharge US troops to build up strength against the German attempt at containment. A single LST could be fitted with berths for some 217 troops. (George Silk/The LIFE Picture Collection/Getty Images)



At the Salerno beachhead, a lieutenant manning a Shore Party Command Post gives instructions over a megaphone. At Salerno, the beaches became heavily congested with traffic – a fact that brought the shore parties much criticism, often unwarranted. (George Rodger/The LIFE Picture Collection/Getty Images)

off the beach. (During Operation *Torch*, the engineers had learned that the wire mesh needed laying upon a base of burlap if it was not to sink into the sand.) Logistics were unloaded from the incessant flow of landing craft, and ammunition and supply dumps were rationalized and ordered in (relatively) secure locations. From D+1, further engineer units joined the effort, including the 337th EGSR (Engineer General Service Regiment) and the 36th ECR. Much of the engineers' heavy equipment also reached the beaches from D+1, speeding up their ability to handle the expanding beachhead.

The engineers had played a critical role in the amphibious landings at Salerno. The battle would continue for many more days yet, however, as the Allied attempt to push inland met resistance in the form of German counterattacks. Much of this fighting is beyond the scope of this book (the following chapter on the Anzio operations explores more of engineer contributions to a prolonged beachhead campaign beyond the initial amphibious landing), but some further comment on the contribution of the engineer troops at Salerno is warranted. The first troops from the 36th ECR, for example, were landed on the evening of September 9, being used to establish antiarmor screens along the Sele River. On September 10, the regiment conducted reconnaissance actions across the Calore River, while H/36th ECR gave the Rangers engineer support for a further landing near Amalfi. The following day, the regiment was mainly engaged in beach operations work, plus the construction of an emergency runway, although the 3/36th ECR was pushed north of the Sele River in a pure infantry role, assisted by a battery of 105mm howitzers. This battalion conducted an



attack against a German strongpoint on the morning of September 12, in an action that continued into the small hours of the following morning. The German troops, showing their resilience and determination, counterattacked and at one point cut off significant numbers of engineer troops, but the US personnel were eventually brought to safety.

Over the next ten days, the engineers of the 36th ECR were in and out of action, all the while performing vital engineering work, such as building crossings over the Sele River. Periodically, a subunit would be called out for combat duties. On D+4, for example, the 2/36th ECR (less Co. D) was moved forward to high ground on the road to the village of Altavilla (at the base of the important Hill 424), toward which the 142d RCT had begun an advance on D+3 (September 12). The advance led to ferocious fighting between the US troops and the forces of 29. Panzergrenadier-Division. At one point, the 2/36th ECR came under attack from German armor attempting to cross a narrow stone bridge across the Calore River. The engineers had set up a 37mm antitank gun and a .50-caliber machine gun in a nearby quarry to cover the bridge, and subsequently managed to knock out the lead tank in a German armored column, this vehicle subsequently blocking the bridge and forcing the other tanks to turn back. The men of the 2/36th ECR stayed in their positions for several days, enduring varying intensities of artillery fire.

Fighting around Salerno dominated much of September, although orders for a general German withdrawal came on September 17. By September 23, X Corps had broken out and was beginning its advance toward Naples, which fell to the Allies on October 1. For the Germans, their failure to turn back the Salerno landing was largely due not to their combat capability, but to their stretched resources and to the immense firepower that US forces could develop.

Pushing out beyond the Salerno bridgehead, an American M4 medium tank rolls past a knocked-out PzKpfw IV medium tank. Note the additional armor plate around the sides and the turret of the German tank, to help defeat various types of armor-piercing shell. The spacing of the armor skirt around the hull could be adjusted according to whether the tank was fitted with winter or summer tracks. (George Rodger/The LIFE Picture Collection/Getty Images)

Anzio

January 22–March 3, 1944

BACKGROUND TO BATTLE

The landings at Anzio on January 22, 1944, and the subsequent battle that developed, form an interesting counterpoint to both the Salerno operation studied previously, and that of Omaha Beach to follow. Unlike both those other operations, the initial landings at Anzio were virtually uncontested, making the establishment of a beachhead unproblematic. What followed next, however, was a controversial lack of drive to exploit that bridgehead through inland advance, resulting in German commanders redirecting their major units to contain and then attack that lodgment in an action that lasted weeks, rather than hours or days.

By late 1943, the Allied advance up Italy had ground to a halt against the Gustav Line defenses. These were a chain of formidable positions embedded in the western Apennines northwest of Naples and dominated by the mountains around Cassino, which sat astride the major north–south Highway 6 road network connecting Cassino and Rome. Frustrated at months of losses for little discernible gain, the Allied planners decided on a major amphibious landing around Anzio and Nettuno, approximately 30 miles south of Rome and 70 miles north of the Gustav Line. If all went to plan, the Anglo-American landing would draw reactive German forces away from the Gustav Line, allowing the Allies to punch through the now-weakened line and resume the advance north toward Rome. The Anzio forces could also swing out to capture the strategically important Alban Hills, which sat between the Highway 6 and Highway 7 roads running into the Italian capital. By this single amphibious maneuver, it was hoped that the German resistance in Italy would begin to collapse.



Yet even before the first landing craft touched the coast around Anzio, effective planning for operation began to weaken under both operational vagueness and expansion. Operation *Shingle*, mainly under Winston Churchill's enthusiastic encouragement, grew from being a diversionary action involving about 24,000 troops to being a major strategic landing of more than 110,000 troops, an expansion that presented logistical challenges in that the Allies were by this stage trying to build up landing forces for the impending opening of a Second Front in Western Europe. The landings would be conducted by the US VI Corps under Major General John P. Lucas, spearheaded by two task forces (the combined task forces known as Task Force 81). TF X-Ray, a US Army unit, was composed of the 3d Infantry Division, 6615th Ranger Force (Provisional), and 504th Parachute Infantry Regiment, while TF Peter, a British Army formation, fielded 1st Infantry Division and 2nd Special Service Brigade. The assault force in total would consist of about 40,000 men and 5,900 vehicles. In reserve, deployable from Naples, would be the US 1st Armored Division and the US 45th Infantry Division.

Force expansion might be viewed as only a positive, but it was made problematic by several factors. First, the growth in forces was matched by a lack of clarity about the strength or nature of the German reaction. Under Kesselring's Heeresgruppe C (Army Group C) were two major army-sized formations: 10. Armee (Vietinghoff) manning the Gustav Line and, farther north around Rome, 14. Armee commanded by Generaloberst Eberhard von Mackensen. Vietinghoff's major formations were XIV. Armeekorps (Cassino Front) and LXXVI. Panzerkorps (Adriatic Front) while Mackensen had LXXXVII. Armeekorps and LI. Gebirgskorps (Mountain Corps). Rome itself was defended by I. Fliegerkorps headquarters, a Luftwaffe formation, which oversaw 29. and 90. Panzergrenadier-Divisionen. The *Hermann Göring* Division was inland acting as a mobile reserve. Below corps level, the German

ABOVE LEFT

Around Anzio, the commander of a German anti-aircraft battery receives ground target information over a field telephone from a forward observer. At the back of his dugout can be seen an M35 leather map case. (ullstein bild/ullstein bild via Getty Images)

ABOVE RIGHT

Two *Fallschirmjäger* take a break during a pause in the fighting around Anzio. Both men are wearing camouflage jackets, of a type that was first issued from 1942 to Luftwaffe field divisions. (ullstein bild/ullstein bild via Getty Images)

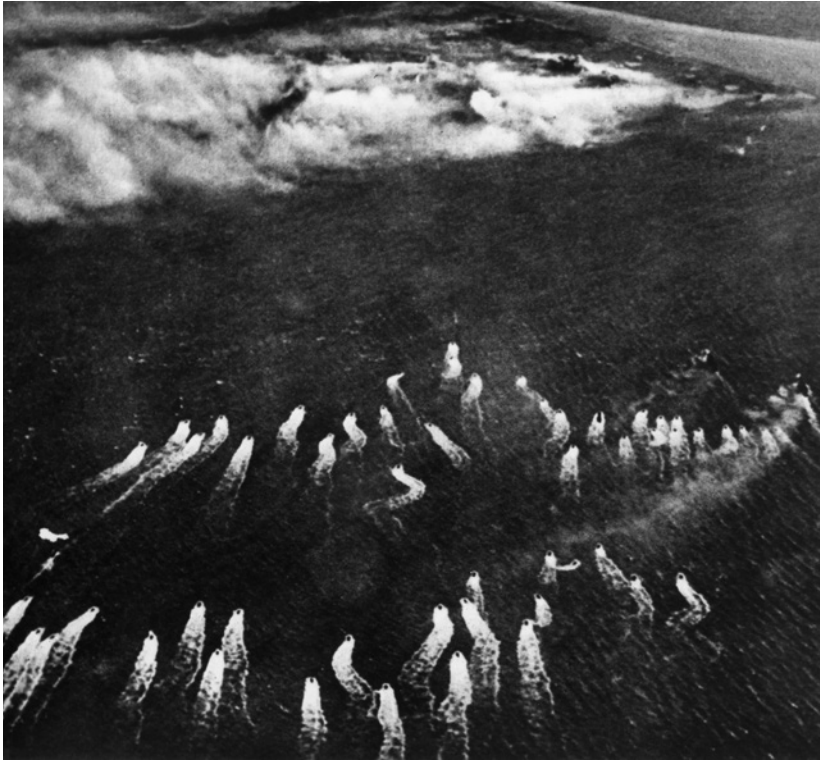
deployment situation around northern Italy was highly fluid, as formations were shuffled between the Cassino Front and other positions for rest and recuperation. Both the 29. and 90. Panzergrenadier-Divisionen, for example, were deployed south to the Gustav Line following the Allied offensive on the Garigliano River on January 18, actually a deliberate precursor to the Anzio landings.

From the Operation *Shingle* planners' point of view, the good news was that 14. Armee, the closest and therefore most immediate threat to the landings, had many understrength and combat-weakened divisions, hence they were primarily used for static defense or antipartisan operations. In the vicinity of Anzio itself, defenses were extremely light – just two engineer companies of 4. Fallschirmjäger-Division (only formed in Italy in November 1943) and two weak *Panzergrenadier* battalions from 29. Panzergrenadier-Division. Coastal artillery defenses were limited to 41 artillery pieces covering an area 40 miles long. Scattered minefields were the biggest immediate danger to those landing.

The Germans remained aware of the vulnerability of the coastline south of Rome, and in late 1943 Kesselring had developed five major contingency plans for redeploying forces from northern Italy, southern France, and the Balkans to contain further Allied landings in Italy. Kesselring's plans were in addition to two major deployment plans mapped out by the Wehrmacht Führungsstab (Joint Operations Staff). Kesselring's plan relating to landing near Rome was called Fall ("Case") Richard, and included the rapid shift of nine divisional- or regimental-strength formations to the coastline.

On the Allied side, there were key people who felt that the Operation *Shingle* plan both underestimated the Germans' ability to amass forces against the bridgehead and overestimated the Allied capacity to smash through the Gustav Line defenses, even with the new threat in the enemy's rear at Anzio. Only two Allied divisions would go ashore on D-Day, and the experience at Salerno had taught the British and the Americans how precarious a contested landing could be. For this reason, the mission objectives emanating from the commander of the Fifth Army, General Mark W. Clark, became more ambiguous and cautious. The main directive Lucas received was that he should "seize and secure the beachhead and advance on Colli Laziali" (the Alban Hills). For all its apparent simplicity, this order is open to all sorts of contextual interpretation. How long should the force take to "secure" the beachhead? When should the US and British divisions begin their advance out from the beachhead, and on what sort of schedule? Should the Allied troops just move toward the Alban Hills or actually assault and take them? As it turned out, this flexible instruction, combined with Lucas' desire to build up combat strength at the beachhead, gave the Germans the time and space they needed to bring Fall Richard into play. By late December 1943, however, this reality had not yet emerged.

The actual plan for the Anzio-Nettuno landing broke down as follows. The port of Anzio itself would be taken by three battalions (1st, 3d, and 4th) of the US 6615th Ranger Group (Provisional), while Nettuno just to the south would be the objective of the 509th Parachute Infantry Battalion. The bulk of the landings would take place simultaneously to the north and south of Anzio/Nettuno. To the north was the responsibility of the British Army's



An aerial view of the Allied landing operation at Anzio on January 22, 1944. The landing craft are maneuvering to prevent German guns being able to zero in on a predictable line of approach. (ullstein bild/ullstein bild via Getty Images)

TF Peter. To the south, TF X-Ray consisted of three US Army regiments, landing on designated Red and Green beaches. At Red Beach, the opening assault would be conducted by the 7th and 30th Infantry regiments, while Green Beach was the responsibility of the 15th Infantry Regiment, all three regiments belonging to the 3d Infantry Division.

As at Salerno, US Army engineers would form a crucial element of both the assault and consolidation phase. It would be their responsibility not only to clear immediate defensive obstacles, such as minefields, but also to oversee the massive inrush of logistics that would turn a strip of Italian coastline into a major US base of operations in a matter of hours. The main US Army engineer units assigned to the Assault Phase were the 540th ECR and the 36th ECR, plus the 1st Naval Beach Battalion. The 39th ECR would join the effort within days of the initial landings.

Training for the Anzio landings left much to be desired, with just two months of preparation. Few practice landings were conducted, and those that were experienced some serious accidents and problems. After a trial landing near Naples on January 18, for example, total losses of equipment included 43 DUKWs, 19 105mm howitzers (plus much of their fire-control equipment), seven 57mm antitank guns, and two 37mm antitank guns (Blumenson 1993: 355). The shocking issues with landing efficiency concerned many of the planners and commanders greatly, especially Lucas, who could not be described as an enthusiast for the Operation *Shingle* plan anyway. Yet the die was cast, and on January 21 the invasion fleet – more than 350 vessels strong – departed from Naples and began sailing the 110 miles up the coast to Anzio.

Anzio invasion and advance, January 22–March 1, 1944

MAP KEY

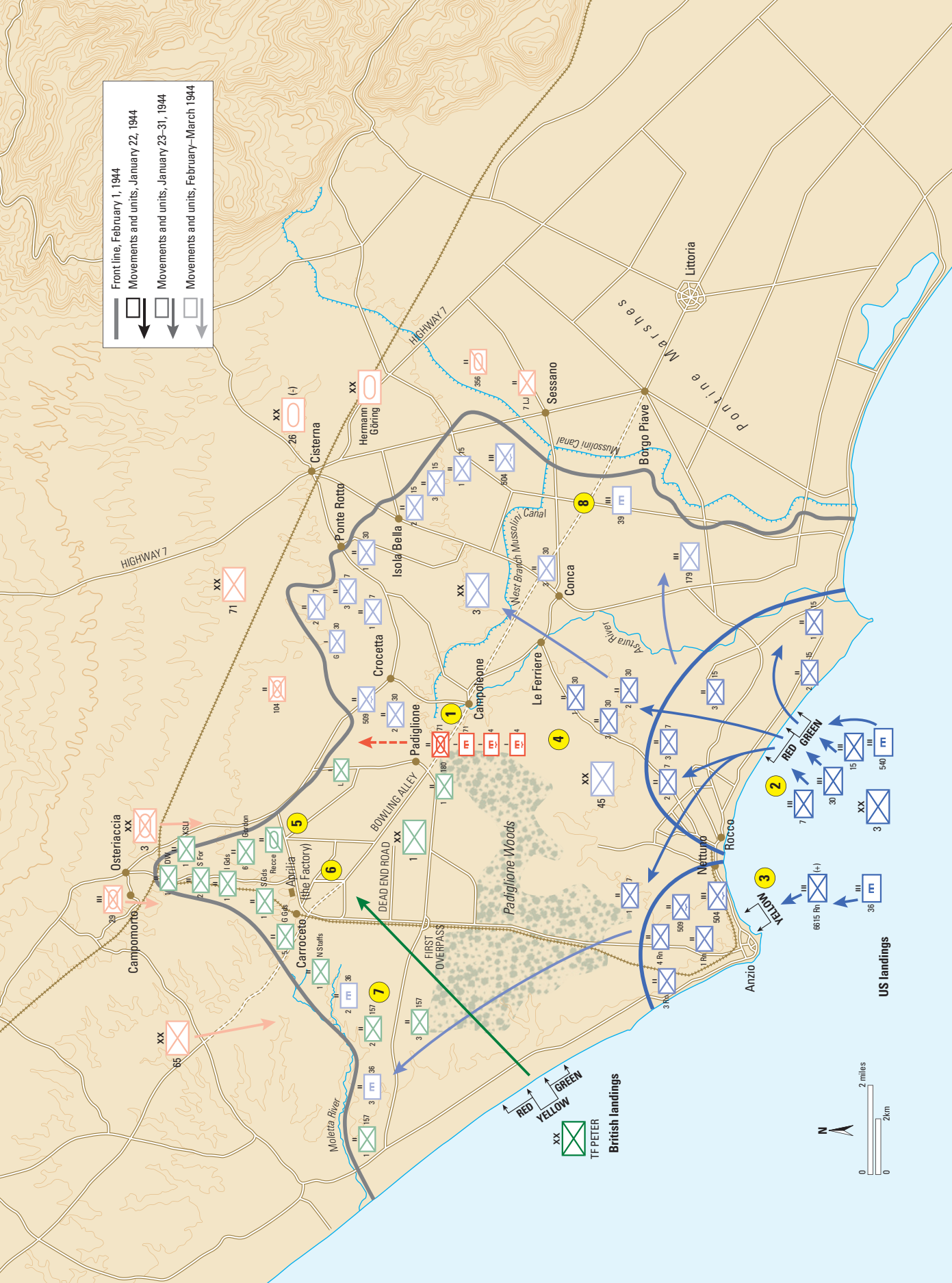
- 1 January 22:** In the opening hours of the battle, the German defensive forces around the beachhead are light, consisting of a few companies of *Panzergranadiere* and *Fallschirmjäger*, with some limited artillery support.
- 2 0200hrs, January 22:** The first Anglo-American invasion troops touch down at Anzio. South of Anzio, on Red and Green beaches, the 540th ECR works in support of landings by units of the 3d Infantry Division. Initial resistance is light, so the engineers set to work consolidating the beachhead logistically and tackling defensive obstacles.
- 3 1800hrs, January 22:** The 36th ECR lands with Rangers and paratroopers directly into Anzio port. H/36th ECR is the first ashore, helping to clear the port for landing craft, and Cos A, B, and C plus the Regimental HQ and 1st Battalion HQ are landed later in the day.
- 4 January 23–29:** The Allies conduct a week-long period of consolidation of the Anzio beachhead, rather than pushing out aggressively into the interior and along the coast. Engineer units during this time largely occupy themselves with logistical operations and mine clearing, even as German artillery fire increases within the beachhead perimeter and German armored, mechanized, infantry, and *Fallschirmjäger* units are pushed into the area to contain the incursion.
- 5 0000hrs, January 31:** The Allied forces begin an attempt to push out of the Anzio beachhead. Progress is made in the British sectors to the north and in the US sector south of Cisterna, but German opposition and counterattacks largely contain the advances.
- 6 2300hrs, February 3:** German counterattacks from February 3 temporarily shrink the Allied perimeter at times, particularly in the north, and the fighting is ferocious. All such attacks are stopped by Allied firepower, however.
- 7 2200hrs, February 10:** Two battalions of the 36th ECR are pushed out to the west to help hold the line on the Moletta River, which is faced with attacks from both 65. Infanterie-Division and *Fallschirmjäger* units. In total the engineers will hold a 3-mile sector for 45 days.
- 8 February 10:** On the opposite side of the front, troops of the 39th ECR are now in position to hold the line along the Mussolini Canal. German infantry and *Fallschirmjäger* engage the engineers in frequent small-unit actions and sniping. By March 1 German units are withdrawing from the Anzio front.

Battlefield environment

For the Allies, the principal features recommending Anzio as a landing area were its flat and shallow beaches. In fact, in many ways the beaches were too shallow, as their very gradual incline meant that the large Liberty ships had to anchor a distant 2 miles offshore, with DUKWs and LCTs transferring the material across this distance to the beachhead. The transfer time involved here dramatically slowed the pace of logistical inflow, with the result that the LCTs had to stay off Anzio well into the spring, by which time they should have been transferred back to the United Kingdom for Operation *Overlord* preparations. The beaches themselves were fine for landing and moving heavy goods and vehicles, with engineer support, but many of the areas just behind the beach were boggy and poorly drained, sewn through with irrigation ditches. When

it rained (which it often did in the winter), the ground could quickly become glutinous and waterlogged. For the Allies, furthermore, there was little in the way of vegetation cover at the beachhead, apart from a section of woodland known as the Bosco di Padiglione, meaning that the German defenders would have clear fields of fire. The landscape was, however, dotted with several villages, which included a defensible mix of low, solid agricultural houses and higher points such as churches and bell towers. Inland, the first major road was Highway 7, but there was also a long straight road running out from Anzio to the small town of Aprilia about 10 miles directly inland. Some 20 miles away were the Alban Hills, which rose at their highest point to more than 3,000ft, offering a substantial physical backstop for the German defenders.

Front line, February 1, 1944
 Movements and units, January 22, 1944
 Movements and units, January 23-31, 1944
 Movements and units, February-March 1944



INTO COMBAT

At 0200hrs on January 22, 1944, the VI Corps invasion force ran in to the beaches of Anzio. Apart from some ripples of rocket fire 10 minutes earlier from British Landing Craft Tank (Rocket) vessels, there was no preparatory bombardment, the Allies hoping to achieve as much surprise as possible. Yet the actual surprise for them was that there was almost no resistance at the beachhead. Some German shore batteries sent out sporadic fire, but this was quickly obliterated by the fire from naval big guns.

Supporting the US 3d Infantry Division troops, the men of the 540th ECR moved quickly ashore, appreciating the lack of return fire, and began to configure the beach to receive heavy logistics, marking out access lanes, checking shoreline supplies, creating dump areas, and laying vehicle tracks. Mine-clearance teams moved farther across the beach to start the perilous work of finding clear exits off the beach areas. There were some German air attacks at first light, but these were fought off by the overwhelming Allied air supremacy in the theater.

A good insight into the engineer operations of the Operation *Shingle* landings comes from the Daily Journal Report for January 1944 by one Major Monnier of the 540th ECR. The entry for January 22 reads:

22 January 1944: (Beach Assault Operation) approx. 2 miles south of Nettuno, Italy. Road Map Italy, 1,200,000, Sheet 17, F9216. Bn Hqs., plus "E" Co., and advance elements of Co's "D" & "F" landed on assault beach at approx. 0300A this date. No immediate enemy action encountered by Bn. During initial phases of operation at approx. 0400A, Pvt Haggerty Co. "E" seriously wounded when he entered a heavily booby trapped enemy mine field. Air raids: 0830A, 1030A, 1240A. During enemy air attack at approx. 0830A Cpl Luttrell, & Pvt O'Neill both of "F" Co. wounded by bomb which dropped on operational beach. Co. "E" started operations on Red Beach this date. Co. "D" landed in support of "E" Co. at approx. 1830A. Co. "F" landed in support of "C" Co. 1st Bn at approx. 0130A, 23 January 1944. Unloaded as follows: Class I – 15.5 tons, Class II & IV – 19.5 tons, Class II – 74 tons, Class V – 86.5 tons, total all classes 194.5 tons. Halftracks & tanks – 144, Guns and SP artillery – 61, all others 611, total vehicles – 819. Personnel disembarked – 9,179. (Monnier Jan 1944: 3)

Some elements of this report require explanation. The reference to maps is important, because the engineers had superb map-production units, whose efforts in creating accurate maps of the landing beaches and the inland areas had a major effect on operational planning. For the beaches themselves, 1:10,000-scale maps were produced, these enabling the assaulting and follow-up engineers to rationalize the beaches more easily. We can also note the sheer volume of supplies unloaded, a major achievement for just a day of effort.

Turning to the classes of supplies, Class I included subsistence items (food, water, and forage), while Class II was composed of essential items for Tables of Organization and Equipment (TO&E) such as clothing, tools, weapons, and spare parts. Class III was made up of POL products, such as gasoline, engine oil, and lubricants; Class IV included general supplies, such as basic



implements (cutlery, tents, etc.), but also included construction materials. Class V included ammunition, explosives, and chemical agents. The 540th ECR was partly able to achieve such impressive feats by the fact that it had obtained plenty of bulldozers, trucks, prime movers, and core engineering equipment, which combined with improvement in their recording systems led to greater efficiency.

The efforts of the engineer units were critical over the next few days as the Allies built up the beachhead, establishing many exits off the beach and major supply dumps. At Anzio port, for example, H/36th ECR went ashore with the Rangers and worked to clear the port for landing craft; three further companies (A, B, C) plus the Regimental HQ and 1st Battalion HQ were landed directly into the port at 1800hrs, to further the work, although they suffered some casualties under shelling from German 17cm field guns inland. Apart from steady shelling and occasional air attacks, the Allied forces at Anzio largely worked in an uncontested environment from January 22 to 25.

As hindsight now tells us, Lucas' decision to wait and put on muscle at the Anzio beachhead before pushing inland was a near-fatal one, providing a window of opportunity for Kesselring to amass powerful defensive forces. At 0600hrs on January 22, Kesselring activated his Fall Richard plan, and several hours later the OKW (Oberkommando der Wehrmacht; Armed Forces High Command) initiated its theatre response, *Marder 1*. Of course, these forces

A German artillery shell thumps into the sea off Anzio as a fleet of US DUKWs attempt to run supplies into shore. In total, 300 DUKWs would be used at Anzio to transfer supplies from Liberty ships several miles out to sea. Engineers and maintenance companies had to work around the clock repairing damaged vehicles. (Hulton Archive/Getty Images)

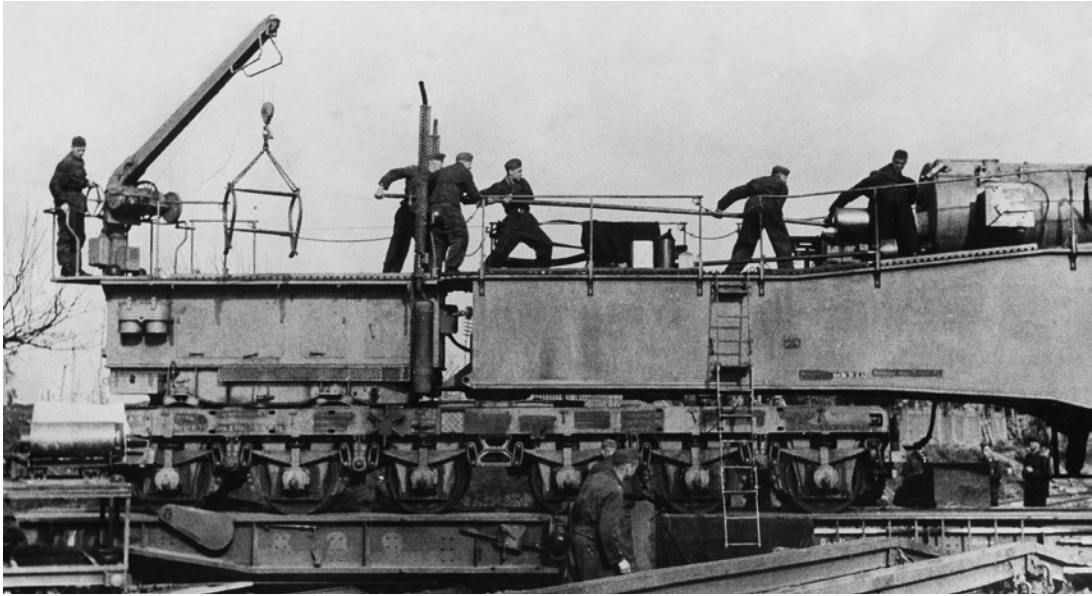


In this aerial photograph Allied landing craft run in to the beaches at Anzio. Just off center is a wrecked vessel, illustrative of the fact that the dangers of amphibious landings did not just begin onshore. (ullstein bild/ullstein bild via Getty Images)

would take time to reach the front line, and on the afternoon of January 22 there was debate in the German–Italian high command as to the correct nature of the response. Vietinghoff recommended that the Germans do what the Allies wanted the Germans to do: pull forces north and effectively abandon the Gustav Line. Kesselring, however, judiciously noted that the forces on the beachhead seemed to be in no hurry to push inland at speed. If they stayed put for at least two days, which they did, then the German redeployments would begin to arrive and the beachhead could be contained and, potentially, crushed.

Kesselring's bold plan was the one adopted. Over the next few days, the Germans built up a truly formidable force surrounding the relatively inert Allied beachhead, a force that for a time outnumbered the Allied troops by about 20,000 men. Vietinghoff's 10. Armee sent nine divisions, including 15. Panzergrenadier-Division and 1. Fallschirmjäger-Division, to the Anzio front; these forces were incorporated into Balck's XIV. Panzerkorps and LI. Gebirgskorps. Mackensen's 14. Armee also deployed elements of nine divisions around Anzio, notably 26. Panzer-Division, 3., 16., and 29. Panzergrenadier-Divisionen, 4. Fallschirmjäger-Division, and the *Hermann Göring* Division, forming I. Fallschirmkorps and Herr's LXXVI. Panzerkorps. There was also an impressive buildup in German artillery batteries; by January 24, there were 71 such batteries ringing the beachhead, and the daily pounding of artillery fire became the drumbeat experience of the troops on the beaches.

It was under this shellfire, plus the increasing attacks from a similarly reinforced Luftwaffe, that the engineers of the 36th, 39th, and 540th ECRs



labored at great risk on the beaches alongside the infantry. Engineers also manned anti-aircraft guns, putting up fire against Luftwaffe strafing and bombing missions. Casualties started to mount daily, including to accidents. On January 29, for example, one Pvt Zerface, of the 540th ECR, was fatally wounded when a DUKW ran over the tent in which he was sleeping. Yet the casualties were still largely minor; the 540th ECR suffered just six battle casualties in January.

The nature of the fighting for the engineers began to change from January 30, when the Allies launched a two-pronged offensive, with the objective of capturing the inland road junctions of Campoleone (British objective) and Cisterna (US objective). The heavy fighting that resulted meant the 36th and 39th ECRs were both committed to the front lines as fighting infantry: the 39th ECR was pushed out to the extreme east of the bridgehead, while the 36th ECR went to the northwest (Beck et al. 1985: 196). The 36th ECR, for example, sent its 2d and 3d battalions out to support troops of the 45th Infantry Division along the Moletta River, taking over positions from the British 56th Infantry Brigade. Within days, the 36th ECR's 1st Battalion had been committed as well, and all told the 36th ECR would hold this 3-mile line for 45 days (Beck et al. 1985: 196).

The engineers' opponents would change over the period, but the principal units they faced were 4. Fallschirmjäger-Division and 65. Infanterie-Division. The 39th ECR meanwhile occupied some 8 miles of front from the sea along the Mussolini Canal, its main opponents being elements of the *Hermann Göring* Division and a battlegroup from 16. SS-Panzer-Division *Reichsführer-SS*.

The nature of the combat for the engineers on the front line varied, from aggressive night patrolling to outright battle. In the 36th ECR's sector, for example, one night saw each battalion send out a small patrol on prisoner-snatch operations. These were unsuitable troops to use for such actions. Not only had they largely received only basic infantry training, but that training

Two 28.3cm Krupp K5 railway guns began shelling the Anzio beachhead in the first week of February. Here we see a gun crew ramming a huge shell home into the breech of the 65ft-long barrel. Such guns had limited use, as they were extremely vulnerable to air attack. (Atlantic-Press/ullstein bild via Getty Images)



ABOVE LEFT

Pfc. Paul R. Umstead of Eagle Grove, Iowa, serving in D/39th ECR, arms antitank mines at the Anzio beachhead. Interestingly, while there is a .45 ACP Thompson M1A1 submachine gun propped up on the storage box, Umstead also has a .30-06 Springfield M1903A3 bolt-action repeating rifle on his back. Although the Springfield rifle had largely been replaced by the M1 Garand by early 1944, the bolt-action weapon continued in service until the end of the war. (US Army/The LIFE Picture Collection/Getty Images)



ABOVE RIGHT

Fallschirmjäger man a defensive fighting position in Italy in mid-1944, as they attempt to resist the Allied push north. Note how two Modell 1924 Stielhandgranaten (stick grenades) are kept ready on the lip of the dugout, with the safety caps removed to expose the fuze pullcord. (Keystone-France/Gamma-Keystone via Getty Images)

would have been mainly designed around conventional tactics, not the covert infiltration and extraction required for prisoner snatches. Nevertheless, they employed sound and light discipline, with camouflage paint applied to skin and helmets removed. The mission was quickly compromised, however, and the patrols returned to their positions in haste with no prisoners but two of their own captured.

A more costly incident occurred on January 31. German *Fallschirmjäger* snipers, ensconced in undergrowth ahead of the line, had been sniping at the engineers relentlessly, particularly those involved in mine clearance. In response, 1st Platoon, Co. F, 36th ECR, was sent over the line to root out the snipers. The German forces spotted the incursion quickly, and utilized their infantry mortars to put the engineer unit under heavy fire that sent the US troops back to their lines with six dead and 25 wounded. For the most part, however, the personnel of the 36th ECR held their defensive positions tenaciously against numerous attempts by the Germans to break through with both armor and infantry. The regimental situation reports reveal daily shelling, but also some offensive action. An entry for February 25, for example, reads: "At 1800A 'A' and 'C' Co will attempt to drive enemy away from positions at 902310, 803314 and 806313. Arty [artillery] preparations to commence at 1745A. During attack the company commander of 'A' Co was killed as was one E.M. [enlisted man]. One E.M. was wounded. 'C' Co had one E.M killed and six wounded" (36th ECR 1943–44: 68).

By the time they were relieved from the line, the 36th ECR had suffered 74 dead, 336 wounded, and 277 hospitalizations at Anzio. For the Germans, however, the experience of attempting to punch through the US lines was a frustrating one, especially as the troops they were facing were often far less experienced than they were. The Germans would attack with mixed armor/infantry units, supported by mortars and artillery, aiming for weak points in the enemy front. Yet the engineers often blunted the armor with bazookas, 37mm antitank guns, or mines, or by blowing key bridges over waterways. German armor also became prey to Allied close air support and onshore and offshore artillery. By March 3, following the failure of the German Operation *Seitensprung* (Escapade) counterattack, launched on February 28 against the



US 3d Infantry Division front, the German casualties at Anzio numbered about 29,000.

Much of the combat work of the VI Corps engineers was dedicated to both mine laying and mine removal. These activities would become the subject of much subsequent self-criticism within the engineer community, as they were beset by inefficiencies and misunderstandings. The recording of new antipersonnel and antitank minefields was, during the early weeks of the campaign, quite inadequate, resulting in many mine-related “friendly-fire” incidents when Allied troops went forward in the advance. Part of the problem was that many of the minefields were laid at night, and in flat terrain with few memorable features (Beck et al. 1985: 197). There were also some issues with incorrect mine-laying technique, particularly in setting mines too close to one another. By way of example, an entire minefield set by the 39th ECR was detonated in a single rippling blast when an enemy mortar shell fell into its midst (Beck et al. 1985: 198).

Yet steadily both minefield recording and mine-laying measures were improved, and ultimately played a significant part in blunting the German offensives. In an example of the intensity with which mines could be laid, in a single day in April one platoon of the 109th ECR laid 109 antipersonnel mines and 2,444 antitank mines (Beck et al. 1985: 197). In addition to this, the engineers constructed numerous bridges, roads, and supply dumps, and helped manage the truly huge influx of supplies into Anzio harbor – more than 230,000 tons in February and April alone. It was such efforts that helped contain all the German attempts to break the Anzio beachhead, and they also assisted the final Allied breakout, Operation *Buffalo*, in late May.

ABOVE LEFT

Taken in Italy in January 1944, this photograph shows US Army engineer mine-clearance teams moving into action with their SCR-625 electronic mine detectors. The mine-detecting coils, mounted under disks of wood, are shown clearly here; maximum mine detection depth was 18in, but 6–12in was more realistic. (Margaret Bourke-White/The LIFE Picture Collection/Getty Images)

ABOVE RIGHT

At Anzio, it was imperative that Allied supplies were protected from the incessant German artillery fire. Here jerrycans of gasoline are stored in a slit trench, just as an infantryman digs a fighting position for himself nearby. (George Silk/The LIFE Picture Collection/Getty Images)





Anzio, Moletta River sector, March 1944



US view: Members of a 36th ECR mine-clearing team scatter as they receive fire from a German sniper, around positions just inland from the Moletta River around Anzio. Mine clearing was a perennial activity for US combat engineers as they advanced in from the beachhead. This team consists of two detectorists, each equipped with SRC-625 mine-detecting equipment, plus

two “tape men” to mark a safe lane with white ribbon and detected mines with yellow marker flags, and other soldiers to provide support and security. Snipers were a constant danger for such teams, however, and here one man has already fallen to the first shot of a German sniper, positioned about 300yd away in the treeline.



German view: The German sniper is wearing a camouflage “Telo Mimetco” jacket, an Italian pattern popular with German troops, plus a face mesh hanging from his camouflaged *Fallschirmjäger* helmet. His weapon is an accurized Kar 98k rifle fitted with a Zeiss Zielvier 4× (Zf 39) telescopic sight. This rifle set-up would enable him to take confident shots out to 600yd,

so the c.300yd distance here would be comfortably within his range. When coming under sniper fire, the typical US response would be to put down heavy firepower onto the identified or likely position of the shot, ideally supplementing small-arms fire with machine guns and mortars.

Omaha Beach

June 6, 1944

BACKGROUND TO BATTLE

The overarching narrative of Operation *Neptune* – the Allied amphibious landing in Normandy in June 1944 – has been told substantially in other Osprey titles (see page 79), so the focus here will be squarely on the Omaha Beach landing, and the role of the combat engineers and the German defenders within that action.

Omaha Beach was the most heavily defended of all the Normandy beaches. The specific German units in the Grandchamps sector (the sector covering Omaha Beach) all came under the command of 352. Infanterie-Division, and constituted two battalions each from Grenadier-Regiment 914, 915, and 916, Infanterie-Regiment 726 (from 716. Infanterie-Division previously garrisoning the area), and Artillerie-Regiment 352. Narrowing the focus down to Omaha Beach specifically, the immediate beach was defended by (from west to east): 11./IR 726, 10./IR 726, 5./GR 916, 8./GR 916, and 1./IR 726. Further reserves provided three additional companies of infantry, while the inland artillery support was provided by the 10.5cm howitzers manned by I./AR 352, II./AR 352, and III./AR 352 and the 15cm howitzers of IV./AR 352 – each artillery *Abteilung* (battalion) having three *Kompanien* (batteries) – plus a battery of *Nebelwerfer* multiple rocket projectors from Werfer-Regiment 84 and 36 8.8cm FlaK guns contributed by the Luftwaffe's 11. FlaK-Division (Zaloga 2003: 37).

In terms of defensive positions, the German infantry overlooking Omaha Beach had the advantage of 14 *Widerstandsnest* strongpoints (WN; “resistance nest”) built into the bluffs that dominated the landing zones, these being a combination of reinforced-concrete pillboxes, machine-gun pits, and antitank-gun bunkers. Further artillery strongpoints on the Pointe et Raz

de la Percée to the east of Omaha Beach offered enfilading fire, while others farther back off the beach were targeted at the “draws” – areas of low ground between two elevations that formed routes of exit off the beach (Zaloga 2003: 33). The German strongpoints and infantry positions were linked together through extensive trench works, themselves excellent defensive positions, and numerous field fortifications.

Adding to the Germans’ defensive advantages was the proliferation of obstacles, mines, and barriers. The first line of defense, at the water’s edge (actually about 100yd above the low-tide mark), were numerous Cointet-element barriers (also known as “Belgian gates” or “C-elements”), essentially boat-wrecking steel fences each weighing just under 3,000lb. Some 30yd farther on were *Tellermine*-tipped wooden stakes, then the concrete-covered iron *Tschechenigel* (“Czech hedgehogs”) tetrahedrons. With some 3,700 such obstacles in place, combined with the firepower positioned on the overlooking bluffs, Omaha Beach was always going to be a tough nut to crack.

The American planners had separated Omaha Beach into eight sectors, from west to east: Charlie, Dog Green, Dog White, Dog Red, Easy Green, Easy Red, Fox Green, and Fox Red. The assault, scheduled for 0630hrs after an intense preliminary naval bombardment, was to be delivered by three RCTs, separated into initial assault forces (“Force O”) and follow-up (H+30) units of “Force B.” In Force O, the 116th RCT (29th Infantry Division) was tasked with assaulting Dog Green, Dog White, Dog Red, and Easy Green beach sectors, with armor support from amphibious M4 DD (Duplex Drive) amphibious tanks of the 743d Tank Battalion; 16th RCT (1st Infantry Division), supported by the 741st Tank Battalion, was given Easy Red, Fox Green, and Fox Red beach sectors; and the 18th RCT (1st Infantry Division) was to undertake further landings on Easy Red beach sector. Force B included the 26th, 115th, and 175th RCTs.

Given the extremely high levels of German defensive arrangements on Omaha Beach, it was obvious that engineer contributions would be critical. Each RCT would be followed onto the beaches by divisional engineer battalions, after which would come the main engineer forces for Operation *Overlord* (the overall invasion of Normandy), provided by the 5th and 6th Engineer Special brigades and collectively organized as the Provisional Engineer Special Brigade Group. This formation was formed on March 1, 1944, and commanded by Brigadier General William M. Hoge (also commander of the 5th ESB). The 5th ESB would be supporting the Omaha Beach landings, the brigade separated into Battalion Beach Groups (BBGs). For the Force O assault, the 16th RCT would be supported by the 37th BBG, the 18th RCT by the 348th BBG, and the 116th RCT by the 149th BBG, plus the 147th BBG attached. (The 147th and 149th BBGs were actually 6th ESB formations, but during the immediate assault they were placed under command of the 5th ESB. Once the landings were successfully ashore then boundaries would be established and these two BBGs would revert to 6th ESB command.) The 336th BBG was intended to land during the afternoon on the easternmost beach sector, Fox Red.

It is important to note, but frequently overlooked, that the engineer contribution during the Assault Phase was not just a US Army affair. To open 50yd-wide pathways through the beach obstacles, to accommodate further



landings, 16 special Gap Assault Teams (GATs) were formed, each consisting of 27 US Army combat engineers (from the 146th and 299th Engineer Combat battalions) plus 13 men from the Naval Combat Demolition Units (NCDUs). The GATs would be moved toward the shore primarily in LCMs, using inflatable rubber dinghies to transport their demolitions equipment the last few yards, each dinghy loaded with about 1,000lb of explosives, detonators, and mine-clearing equipment. At the shoreline, the US Navy GAT men would use their explosives to blast away Cointet-element barriers, while the US Army soldiers would venture a little farther up the beach to tackle the other obstacles. Each GAT would be assisted by a tank-dozer (an M4 medium tank fitted with a bulldozer blade) landed from an LCT. The GATs were assigned to the different beach sectors: Teams 1, 3, and 4 were assigned to Dog White; Team 2 operated on Dog Green; Teams 5 and 6 were on Dog Red; Teams 7 and 8 were assigned to Easy Green; Teams 9, 10, 11, 12, 13, and 14 were to operate on Easy Red; and Teams 15 and 16 were assigned to Fox Green.

Following them within five minutes would be eight engineer support teams (one such team to every two GATs), which would help to develop the work begun by their spearhead colleagues. Major landings of the BBGs would then commence at H+30. As the engineers were landed in increasing numbers, some would move inland to clear mines and further obstacles, while others would assist in the assault and demolition of strongpoints, the offloading of supplies and vehicles, and the creation of ordnance and equipment dumps, and perform the requisite bridging/track-laying activities to get vehicles and artillery across the awkward scree slope at the top of the beach (see “Battlefield environment” below). The engineer forces would also apply themselves to clearing the path through predesignated beach exits, so that the invasion force could penetrate inland.

The landings on Omaha Beach were meticulously planned – perhaps too meticulously, as later study suggested. All involved knew that they would face resistance at the beach, and that the Germans would not simply open the door and allow the Allies to establish an easy foothold back on occupied Western Europe. Few could have imagined, however, the hours ahead that would, if they survived, in many ways shape the rest of their lives.

ABOVE LEFT

A German anti-aircraft position on the Atlantic Wall, 1944, prior to the Allied invasion of Western Europe on June 6, 1944. The weapon is a 2cm FlaK 30 anti-aircraft gun, and weapons such as these would also find utility operating in a direct-fire role against US landing craft, to an effective range of nearly 3,000yd. (LAPI/Roger Viollet/Getty Images)

ABOVE RIGHT

A modern photograph of a surviving German bunker complex in Normandy. The photograph illustrates why the major German strongpoints were so difficult to suppress. The shape of a strongpoint was first crafted from steel reinforcing bars, with concrete poured over and into this frame. (Roger Viollet Collection/Getty Images)

Omaha Beach, June 6, 1944

MAP KEY

- 1 0415hrs:** The first waves of the Omaha Beach assault force (16th and 116th RCTs) deploy on their landing craft to make the journey to Omaha Beach, each RCT assigned a designated beach sector with engineer Gap Assault Teams (GATs). The 118th RCT will make follow-up landings on Easy Red.
- 2 0630hrs:** The GATs and the RCTs begin landing. Weather and sea conditions, plus the ferocious German defense on the approach, result in many landings being scattered, the troops often landing beyond their intended beach sectors.
- 3 0630hrs:** The German defenders in the strongpoints and trench networks overlooking Omaha Beach put down heavy machine-gun, mortar, and artillery fire onto the landing craft as they approach, destroying many vessels, inflicting terrible casualties, and pinning thousands of men on the shoreline.
- 4 0630–0700hrs:** GAT 14 is the first of the Gap Assault Teams to land on Omaha Beach, although at least half of its personnel are killed during the first few minutes. The adjacent GAT 13 has a similar experience. The fire from Widerstandsnest 62 (WN 62) stops all the GAT attempts on Easy Red to breach the obstacles and penetrate inland. By 0730hrs, however, the combined force of assault infantry, surviving GAT engineers, plus troops from the 37th BBG (which landed at 0700hrs) manage to create a broad body of gaps through the obstacles and penetrate inland to assault WN 62.
- 5 0630–0720hrs:** On Easy Green beach sector, GATs 7 and 8 cut a 50yd-wide gap through the beach obstacles.
- 6 0630–0730hrs:** GAT 1 is blown off course on its approach, landing on Dog White beach sector instead of Dog Green beach sector. There it comes under fire from multiple strongpoints manned by troops of Infanterie-Regiment 726. Despite this early setback, the engineers blow a gap through the obstacles, which constitutes the only breach in the western half of Omaha Beach.
- 7 1200hrs:** By this time, the US forces have managed to make penetrations around the D-3 Les Moulins, E-1 Saint-Laurent, and F-1 Cabourg draws. The German resistance, although still extremely heavy, is starting to crumble in many sectors, under the weight of Allied firepower and the persistent incursions by infantry and BBG engineers.
- 8 Afternoon:** the 336th BBG is blown wildly off course from its intended landing on Fox Red beach sector, and ends up on Dog Green and Dog White beach sectors. There the troops manage to blow further gaps through defenses around the D-1 Vierville and D-3 Les Moulins draws. Troops on Dog White then subsequently march across to beachfront to Fox Red beach sector, suffering further heavy casualties on the way.
- 9 Afternoon and evening:** The US forces finally break through the German defenses, despite the German pushing limited numbers of reinforcements forward. The deepest penetrations are opposite Charlie, Easy Green, Easy Red, and Fox Green beach sectors. The landing forces are now securely ashore on Omaha Beach.

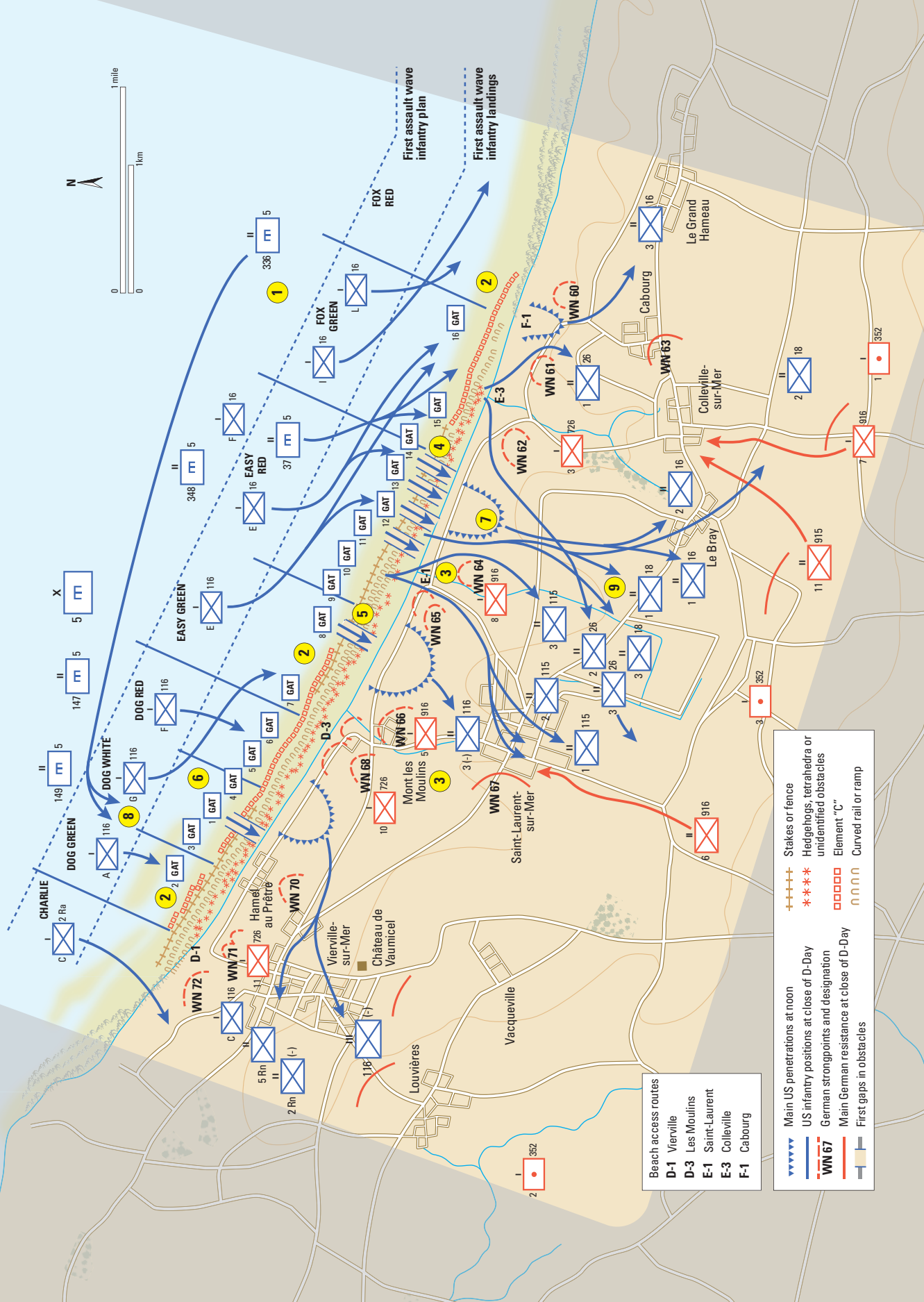
Battlefield environment

The Omaha Beach landings would take place over about 7,000yd of shoreline. The beach itself was shallow and sandy, and about 400yd deep at the point of low tide, when the landing would go ashore. The draft of an LCM was about 3ft, meaning that the landing troops would certainly get wet even if taken right into the beach; many troops would ultimately be disgorged farther out, partly accounting for a significant number of drownings on D-Day. At the high-water line (1100hrs on D-Day) began a short section of shingle about 16ft deep, backed by a sea wall. Allied intelligence had actually underestimated how problematic this stony barrier would be for the landing forces; each stone was about the size of a golf ball, and cumulatively they would make it extremely difficult for Allied vehicles, both tracked and wheeled,

to gain traction and move forward. Beyond the sea wall was an expanse of undulating grassy land about 200yd deep, behind which the landing rose steeply to heights of about 100–150ft. Both the grassy area and the heights gave the Germans superb defensive command of the beach. They provided excellent fields of fire for artillery and machine guns; even machine guns mounted on the tops of the cliffs operated well within their effective range against shoreline targets, even at low tide. The bluffs were cut through by several “draws” (basically areas of low ground between two elevations), and these were designated as exit points for the landing forces. The Germans also knew that these were natural avenues of egress, hence they had them littered with obstacles and mines and covered by strongpoints.

Beach defenses in Normandy shortly before the D-Day landings. Note the mixed field of wooden stakes, *Hemmbalk* (“obstruction beam”) structures, and *Tschechenigel* (“Czech hedgehog”) tetrahedrons. (Galerie Bilderwelt/Getty Images)





INTO COMBAT

H-Hour for the lead tank battalions, the infantry, and the supporting GATs at Omaha Beach was 0630hrs (low tide). This timing held in reality, but only after the engineers had spent many miserable hours sitting out in the Channel in their landing craft, freezing, wet, and seasick. Not that the Germans at Omaha Beach were having an easy time. Having been on alert since about 0100hrs, when Allied airborne deployments began in the rear areas, they had become acutely aware of the emerging invasion at about 0545hrs, when the British and US navies began their bombardment of the beachhead areas. The German infantry, many of them relatively exposed in trench positions, witnessed a wrenching display of firepower, including from heavy naval guns and rocket-equipped landing craft, the latter of which fired some 9,000 missiles alone. British and American high-altitude bombers dropped 1,600 tons of ordnance over the landing areas. Franz Gockel was an 18-year-old soldier stationed in WN 62 which overlooked the E-3 Colleville draw on the junction between Fox Green and Easy Red beach sectors. He remembers the terrifying onslaught of firepower, the c.20–25 men in each strongpoint choking on airborne fumes, sand, and dirt, and being shaken by the explosions. He also noted that the naval bombardment was by far the worst for the German troops, owing to its precision and intensity. Gockel observed many of the beach obstacles being wrecked by the firepower, but equally noted that many remained standing and intact. As we now know, however, much of the Allied preparatory fire spared the strongpoints, hitting targets more on the shoreline and inland. Furthermore, the German artillery units on the cliffs judiciously held their fire until Allied troops were ashore, to avoid betraying their positions through muzzle flashes.

The first Allied troops went ashore on Omaha Beach at between 0625hrs and 0630hrs, straight into the most ghastly experience imaginable. For the GATs, and the engineer support units that attempted to move in a few

BELOW LEFT

1st Infantry Division soldiers of the 16th RCT board an LCT named "Channel Fever" in southern England on June 5, 1944. They would be supported by major engineer elements, including eight engineer Gap Assault Teams and the full weight of the 37th Battalion Beach Group. (Galerie Bilderwelt/Getty Images)

BELOW RIGHT

An LST is prepared for the Normandy landings, being loaded with vehicles and supplies. On D-Day itself, the US Navy refused to take LCTs too close into shore for fear of beaching, although in the days after June 6 they moved far nearer the shoreline. (Galerie Bilderwelt/Getty Images)





The Pointe du Hoc cliff top, here in the possession of US Army Rangers after a fearsome cliff-scaling assault, lay 4 miles west of the center of Omaha Beach. It provided the German forces in the sector with an excellent artillery observation platform, manned by artillery troops and elements of 352. Infanterie-Division. (Galerie Bilderwelt/Getty Images)

minutes later, just making it to shore was terrifying and bloody. With almost no armor in support (the majority of the M4 DD amphibious tanks had sunk in the Channel), and with an unexpectedly strong easterly current taking many landing craft off-course, the heavily burdened engineers ran in through a storm of artillery and machine-gun fire. The first GAT to land was Team 14 on Easy Red beach sector. Most of the US Army engineers disembarked, towing their explosives ashore in a rubber dinghy, but then

This view of US landings on the Normandy beaches is illustrative of the chaos that could ensue during an amphibious landing. Command and control in this sphere lay largely in the hands of "shore parties," mixed US Navy and US Army units with responsibility for organizing the movement of craft and supplies up to and beyond the water's edge. These shore parties included engineer elements, which would perform tasks such as obstacle demolition and offloading combat supplies. (Galerie Bilderwelt/Getty Images)



an artillery shell hit the LCM behind them, detonating the contents of the second dinghy and killing most of the naval members of the GAT; Team 13 suffered the same experience (Beck et al. 1985: 323). Just minutes into action on D-Day, half of its team was dead. A similar experience was had by other engineer teams across Omaha Beach. On Dog White beach sector, only one member of Team 3 survived after its LCT was hit by a shell. Most of Team 15 was also killed when their demolitions dinghy was struck by shellfire.

Those troops that did make it to shore were lacerated by blistering artillery and shellfire, cutting men down constantly. Many engineer teams subsequently realized that their dinghies were actually attracting German fire, so started to abandon them, choosing to take their explosive ashore by hand. Other pieces of equipment often ditched at the shoreline included the SCR-625 electronic mine detectors (not only were there no buried mines on the beach itself, but the mine-detector operators were targeted by German snipers) and Bangalore torpedoes, the latter of which proved awkward to handle and unsuited to the types of beach obstacles encountered (they would come into better service behind the sea wall, for cutting barbed wire and for blowing paths through minefields).

Despite the hell of fire across the landing beaches, the NCDUs and combat engineers nevertheless set to work attempting to demolish the obstacles, principally using 40lb bags of Hagensen Packs. This effort was problematic in the extreme because the intensity and accuracy of the German defensive fire made handling any sort of ordnance perilous. On Easy Red Beach, Team 12 blew a 30yd-gap through beach obstacles between the E-3 Colleville and E-1 Saint-Laurent draws, but a German mortar round struck several rigged-up demolition charges, all connected by Primacord, and detonated the lot simultaneously – ten members of the GAT were killed and six others wounded. Surviving members of Team 13 had a similar experience. Another issue was that the assaulting infantry around the engineers, naturally seeking out any cover they could, tended to shelter behind the obstacles, meaning that the engineers could not demolish the obstacles for fear of killing their own people. A US Navy after-action report about the NCDUs on D-Day commented on this problem, and on the general threats facing the GATs:

... at least five Army or Navy units were prevented from setting off charges which they had fitted by the presence among the obstacles of either assault or later waves of infantry, and even vehicles. (At least two units report misfires caused by the fact that the primacord linking their various charged obstacles was cut by troops and vehicles, passing through the gaps despite efforts to signal them away.) Death prevented three other Navy units from firing. (Of these, one was caught aboard the LCM by machine gun fire, while they strove to off-load their rubber boat; another was eliminated, after setting its charges, by well-placed mortar fire. The third was blown up after bringing in its rubber boat, when a direct hit set off the auxiliary explosives in it and somehow also the charges at the obstacles where men still were.) A freak accident caused the failure of another naval group; the officer was about to pull the twin friction-igniters, when a bit of shrapnel cut the two fuses and his finger as well. The enemy saved one naval team the trouble of pulling



The body of a US soldier awaits collection on Dog White beach sector, Omaha Beach, on June 7, 1944. Note the US Navy M1926 Inflatable Floatation Belt Life Preserver around his waist. He is alongside one of the wooden beach obstacles known as *Hemmbalken* ("obstruction beams"), which were often tipped with a *Tellermine*. (Galerie Bilderwelt/Getty Images)

its igniters, when a bullet or fragment managed somehow to set off the primacord and all the charges! (US Navy 1944)

Despite the losses and the chaos, the GATs manage to cut at least some lanes through the obstacles on Omaha Beach. On Dog Green beach sector,

German forces around the Caen area prepare to move out following reports of Allied landings on the Normandy coastline. These vehicles are 15cm Panzerwerfer 42 auf Selbstfahrlafette SdKfz 4/1, each mounted with a ten-tube *Nebelwerfer* multiple rocket launcher. (ullstein bild/ullstein bild via Getty Images)



Louis Drnovich

Louis J. Drnovich was born on August 12, 1915, in Los Angeles, and later went on to play college football for the University of California–Berkeley Golden Bears. His wartime military experience began in the engineers, and he rose to become a captain, commanding A/37th ECB. Drnovich found himself in one of the first waves on Omaha Beach, in front of the E-3 Colleville draw and taking extremely heavy artillery and machine-gun fire as he guided in numerous vessels. During this time he personally

waded into the water to save two GIs from drowning. He also directed fire against the German positions. Having become frustrated by fire from one German artillery piece, he set off with personal weapons in an attempt to hunt down and destroy the gun. He never made it, and his body was later found in the late afternoon. His body still rests in the Normandy American Cemetery and memorial in Colleville-sur-Mer, Normandy.

GAT 1 blew a 50yd-wide gap through the obstacles. A further narrow passage was made at Easy Green beach sector, but the biggest cut was on the eastern side of Easy Red beach sector, where four individual passages added up to a cleared section of more than 100yd. All of these passages, so hard-earned, would be invaluable in ensuring that Allied forces landing subsequently would be able to take the battle from the shoreline up into the sand dunes and cliffs.

It is easy to see why the defenders were able to inflict such a profound level of loss on the first troops arriving at the beaches. Taking Easy Red beach sector again as an illustrative example, this was dominated by three strongpoints, from west to east WN 62, WN 64, and WN 65. WN 64 was the weakest of the three. Behind its outlying defenses of trenches, barbed wire, and mines, it had positions for just a 2cm FlaK gun, a captured Soviet 7.62cm antitank gun, and two 5cm grenade launchers in “Tobruks” or *Ringstände*, small concrete bunkers. WN 65, by contrast, covered the E-1 Saint-Laurent draw with two 5cm antitank guns, one 7.5cm antitank gun, and two 5cm grenade launchers in Tobruks; but WN 62, overlooking the E-3 Colleville draw behind Fox Green beach sector and the western side of Fox Red beach sector, had two 7.5cm antitank-gun casemates (albeit not entirely finished on D-Day), a 5cm antitank gun, a heavy-machine-gun position, multiple 5cm grenade posts, and two 5cm antitank guns. This sizable and formidable position also had an observation post connected to outlying artillery batteries. In total, WN 62 was manned by 35 men: 21 from 3./IR 726 (716. Infanterie-Division), seven soldiers of Artillerie-Abteilung 352, and seven infantrymen from Grenadier-Regiment 916. Together the men of these three strongpoints, plus the many troops in surrounding infantry fighting positions, were able to put down a wall of fire onto the beach in front of them.

Because of these defenses, the experience of the US follow-up troops was just as horrific as that of their predecessors. The support teams ran in amid devastating fire, which blew up numerous LCMs on the approach and added dozens of casualties with every boat that disgorged. Some 30 minutes after the first Allied troops had touched down on Omaha Beach, subsequent assault waves and the main BBGs from the 5th ESB rolled in. These did not just include pure assault engineers, but also quartermaster units, ordnance

Franz Gockel

Franz Gockel was typical of many of the young German defenders at Omaha Beach in June 1944. The oldest of seven children, he was born on December 30, 1925, in Niederense. During his teenage years he started work in his father's roofing company, training as a roofing worker. In 1943, however, he labored for a short time in the Reichsarbeitsdienst (RAD; Reich Labor Service) before being conscripted as an infantryman in Infanterie-Regiment 726, in which he served as a machine-gunner. On D-Day he manned an MG 42 in WN 62 overlooking Omaha Beach, from where he

and his team inflicted hundreds of casualties upon the landing US troops. He claimed to have fired some 12,000 rounds that day from the weapon, which eventually malfunctioned. Gockel was later that day shot through the hand, a wound that took him out of the fighting war. After 1945, Gockel resumed work for the family company. He died aged 79 on December 22, 2005, having made commemorative trips to Normandy several times and met US veterans potentially wounded by Gockel's own gun.

maintenance units, POL troops, signal troops, and military police, rolling in on LCTs, LCIs, and LCVPs. If they were expecting the landing zone to be in any way consolidated, they would be confronted with a very different reality. If anything, the fire was just as intensive and lethal as it had been a half-hour earlier.

The first of the BBGs to land was the 37th BBG on Easy Red and Fox Green beach sectors, at 0700hrs. The passage in had been harrowing. Multiple landing craft were hit by artillery shells (50 percent of the LCTs were struck); one LCI hit a mine, blowing a huge hole in its hull and side, then seconds later was struck by an artillery shell, killing many of the occupants. One landing craft became trapped on an offshore stake, and its troops were forced to go over the side into deep water. Remarkably, the men of the 37th BBG not only managed to clear many beach obstacles, but they also went forward with the infantry into the sand-dune line and up into the cliffs, where they attacked the strongpoints and dugouts and began to push up the draws that would become the exits off Omaha Beach. The first major penetration came at 0730hrs, when a US platoon managed to get off the beach and ascend the bluff near WN 62. Examples of bravery from those hours are legion. A group of US infantry were trapped on the sand-dune line by a mixed belt of antipersonnel and antitank mines and double-apron barbed wire, at the same time being hit by mortar, machine-gun, and artillery fire. A reconnaissance section from B/37th ECB responded to the situation and, with almost reckless bravery, six men of the unit volunteered to clear a path through both the barbed wire and the minefield. They accomplished this task with wire cutters, Bangalore torpedoes, and mine detectors, but in the process all six were wounded. For their extraordinary efforts, one of the men (Sgt. Zolton Simon) was awarded the Silver Star and all others the Bronze Star. By the end of the day, the 37th ECB had suffered 24 killed.

For the Germans, the situation by mid-morning was getting increasingly serious. They were still putting down heavy fire and inflicting terrible casualties, but the US troops were steadily moving inland, and strongpoints were being knocked out, either by offshore naval gunfire or by infantry/engineer teams using demolition charges and flamethrowers. German antitank guns and machine guns particularly targeted engineer bulldozers that



ABOVE LEFT

These US troops of the 16th RCT are being put ashore on Easy Red beach sector, overlooked by the WN 64 strongpoint (not visible in this image) on the cliffs in the background. On the left and right at the beach edge, DUKWs are driving onto the land. These vehicles were especially useful for engineer supply units, as each vehicle could carry 2½ tons of supplies, although they were often overloaded. During the Operation *Husky* landings, for example, one DUKW was so heavily stacked with 105mm shells that it sank as soon as it rolled off its deployment craft. (Galerie Bilderwelt/Getty Images)

ABOVE RIGHT

An elevated aerial view of the scene at the D-Day beaches. The amphibious traffic had to be organized in two directions, both heading onto the beach and then returning to offshore vessels for reloading with men and supplies. (ullstein bild/ullstein bild via Getty Images)



were attempting to clear the vehicle- and obstacle-blocked beaches, and were clearing paths for armor and vehicles through the single section. Many of the bulldozers were knocked out, or their operators killed, but enough remained functional to do sterling work.

For a time, particularly during the morning period, the German situation at Omaha Beach appeared sustainable. Generalleutnant Dietrich Kraiss, commanding 352. Infanterie-Division, even pushed up some limited reserves to the beachhead, with the possibility of launching a decisive counterattack. In reality, however, the defense of the Normandy coastline was collapsing. Communications between many of the German units had been cut by the shelling and bombing, often giving Kraiss a patchy insight into which strongpoints had fallen and which had not. The intensity of the German firing was also causing serious ammunition depletion. By late morning, further landings of US engineers meant that the invaders were claiming some order over Omaha Beach, while on neighboring Gold Beach the British were making good penetrations inland, threatening the German flank at Omaha Beach.

In some cases, the German troops did manage to fight off localized landings, however. Three platoons of Co. C, 336th Battalion Beach Group, for example, were unable to land on Easy Red beach sector (from Easy Red they were then meant to move a few hundred yards across to support operations on Fox Red beach sector) and were instead driven off and eventually put ashore on Dog Green and Dog White beach sectors, some 2 miles from where they were intended to be. There they faced men of 7./GR 916, who held strong defensive positions above the beaches, with local stone villas providing good vantage points for placing machine guns and snipers. The defenders were already roughly handling the 112th, 121st, and 147th ECBs. Yet engineers from the 121st and 147th ECBs had nevertheless managed to blast holes through defenses guarding the D-1 Vierville and



D-3 Les Moulins draws, and by 2000–2100hrs Allied forces were pushing up and through these exits, the German troops and strongpoint steadily crumbling under weight of fire. The troops of the 336th BBG on Dog Green beach sector, however, subsequently marched the 2 miles across the beach from Dog Green to Easy Red beach sector. Their journey was a horrendous one, under fire almost all the way, especially around the E-3 Colleville draw. They eventually reached the F-1 Cabourg draw on the Fox Red beach sector, where they worked hard to clear minefields, and between 2000hrs and 2230hrs US armor began to move in strength up through the F-1 Cabourg draw.

As D-Day moved toward D+1, therefore, Omaha Beach was largely in Allied hands, and the battle was moving into the villages and lanes beyond. Without the engineers, this situation would have been virtually unachievable, but the originally tight plan for obstacle clearing and beach consolidation had been left in tatters by the trenchant German defense. By the end of the day, the engineers had cleared 13 of the 16 planned beach gaps, and some 35 percent of the beach obstacles (Zaloga 2003: 82), but that feat had virtually taken all day, not the 30 minutes allocated. Yet as the Allied buildup at Omaha became overwhelming during the afternoon of June 6, the Germans who had not been killed or captured were progressively driven from their strongpoints and pushed back to lines of defense about 1,000–2,000yd inland. The beachhead at Normandy was now open, and the liberation of France could begin.

US troops inspect one of the heavy coastal gun batteries typical of German defenses overlooking the Normandy beaches. This particular piece of artillery is a Skoda 21cm Kanone 39 naval gun. Most such weapons were quickly put out of action in artillery duels with offshore Allied naval firepower. (Galerie Bilderwelt/Getty Images)

Analysis

The battle between US combat engineers and German coastal defenders on the shores of Salerno, Anzio, and Omaha Beach cannot, of course, be taken in isolation from the totality of all forces involved in the operations. The combat engineers were, after all, a numerically minor (albeit critically important) element of overall landing forces that the Germans had to fight. In all the actions described, furthermore, the German troops also fought without air superiority or decisive support from the Kriegsmarine (German Navy) offshore. It is certain that the German defenders recognized the importance of engineers to the success of the landing operations, however. Any US combat engineer carrying visually distinctive material, such as Bangalore torpedoes or metal detectors, or operating high-profile vehicles such as bulldozers, became priority targets for German gunners of all descriptions.

Above all, the German forces never seemed able to win the battle of numbers. The aforementioned Franz Gockel, the German soldier on Omaha Beach on D-Day in Normandy, noted that with every wave of landing the Allies put ashore more troops than the Germans possessed in the entire bay. Doing the math in his head, he observed that while each strongpoint had on average about 20–25 men, each landing craft was putting ashore 30, 50, or 100 soldiers.

Another reason for the German defeats is surely one of intelligence – although the German theater commanders had a sense of where landings might take place, Allied secrecy and subterfuge meant that the exact locations and timings were largely hidden from view until the last moment. Even at Salerno, when the Germans were to some minor degree forewarned, the advance notice did not come early enough to enable them to amass a defense equal to the incoming force. In both Italy and western France, furthermore, German forces were generally stretched thinly along the coastal areas. The armored counterattacks that could have potentially thrown the Allies back into the sea never materialized in the immediate



hours of the landing; by the time German battlegroups had assembled and moved forward, often slowed by the predations of Allied airpower, the beachhead had built up enough strength to either drive inland or at least establish durable defensive lines. Once these lines were established, as at Anzio, and combined with growing US fire superiority, it became hard for German troops to dislodge the enemy, and thus the defenders lost the battle of the buildup.

We can also ask whether the Germans could have done significant work to improve the fixed defenses facing an invasion force. The answer is certainly so at Salerno and Anzio. There minefields and occasional obstructive landscape features proved to be the most significant blocking features, but the greatest dangers the invaders faced were active – German artillery, machine guns, and snipers – which could be countered with US firepower. As we saw at Omaha Beach, the presence of large numbers of offshore and onshore obstacles did present a major challenge to the combat engineers and the assault infantry, creating chaos and inertia among the landing forces and channeling them into kill zones and confined target areas.

The Salerno, Anzio, and Normandy landings provided some of the most informative laboratories for amphibious warfare. For the engineers, the knowledge of how to improve their operational capability came incrementally, and painfully. Seven key lessons were learned at official level.

First, proper amphibious landing training, involving realistic practice assaults using live fire and large numbers of troops, was critical to ensuring the success of a mission, particularly among units with a high percentage of “green” personnel. It was also imperative that the engineers practice assaults from the craft they would actually deploy from on D-Day. In addition, because of the likelihood that engineers would at some point be repurposed as infantry, formal squad-, platoon-, company-, and battalion-level infantry training should be implemented.

Second, engineers landing in the immediate assault waves had to avoid being overloaded with equipment. If equipment was too awkward or voluminous to handle, much of it tended to be lost in the confusion of a combat landing. Sensitive equipment, such as mine detectors, was also very susceptible to water damage.

ABOVE LEFT

On the Anzio/Nettuno front, these *Fallschirmjäger* are in the process of laying *Tellerminen* across a stretch of road. I. Fallschirmkorps was the principal formation charged with creating the physical defensive systems around the Anzio beachhead. Thinly stretched across multiple fronts, German coastal defenders were only ever a relatively thin crust to guard against Allied landings, which brought a scale of logistics and manpower the Germans simply could not match. (Heinrich Hoffmann/ ullstein bild via Getty Images)

ABOVE RIGHT

This Atlantic Wall gun pit is equipped with two MG 34 machine guns placed in a Zwillingssockel 36 dual antiaircraft mount. This mount could also be fitted to vehicles as a mobile gun platform. It must be remembered that compared to the 32,000-plus US troops who landed on Omaha Beach, the total number of Germans holding the area was fewer than 8,000. That they were able to inflict more than 2,000 casualties on the US landings is testimony in large part to the defensive positions they occupied. (Photo 12/UiG via Getty Images)

Third, conspicuous equipment and landing craft (e.g. mine detectors and specialized rubber boats) attracted concentrated and accurate fire from the enemy, especially if that enemy had direct observation of the landing zones from elevated positions.

Fourth, having the engineers land immediately alongside the assaulting infantry could be problematic, as engineering tasks (such as demolishing obstacles) might clash with the presence or tactical objectives of the other troops. To provide a better operating environment for the engineers, some recommended that the engineers were only landed once the infantry had pushed up the beach.

Fifth, destroying shoreline obstacles with demolitions could be problematic, because of the proximity of friendly troops. In reality, it was found that many offshore obstacles could simply be avoided by the landing craft or even pushed over using their bows.

Sixth, on the approach to the landing beaches, some engineer teams found that they increased their survivability by *not* firing their machine guns from the LCMs on the approach, as the muzzle flashes provided ranging information to the enemy.

Finally, at Omaha Beach, the 30 minutes allotted for the first wave to clear the beach obstacles was simply not enough in a heavily contested landing. If follow-up forces landed too soon after the initial assault, there would be heavy casualties as men and vehicles massed chaotically on the beach, maximizing target opportunities for the enemy. Therefore expectations of how quickly beach obstacles could be cleared needed to be dialed down.

Going back to a point made early in this discussion, in all theaters in which US Army combat engineers served there could be a distinctly blurred line between engineer and infantryman, the former often being repurposed as the latter. In many cases, this was simply the consequence of combat engineers – front-line troops, after all – responding to a variety of emergencies and opportunities of the evolving combat situation. If an engineer platoon came under direct attack by enemy forces, for example, they would of necessity have to respond with infantry defensive tactics. On other occasions, however, as we have seen at Salerno and Anzio, entire combat-engineer units and formations were taken off engineer duties and placed on the front line, squarely in an infantry role. At Anzio, for example, the 36th ECR spent weeks manning the lines on the Moletta River. During this time, they were principally used for defensive work, holding a flank sector, but as reports show, units periodically conducted offensive operations, usually designed to push back threats from their perimeter. The performance of combat engineers as infantry was mixed, however. That their contribution was both brave and valuable is not to be doubted, but there were certainly occasions when engineers were outclassed by experienced German infantry and *Panzergrenadier* units, although the almost unquestioned superiority of US artillery and airpower meant that the engineers could still often survive the day even when facing an on-paper superior force.

There were several intrinsic problems for the engineers when repurposed as infantry. The first was training. Although infantry tactical skills were embedded in official publications such as FM 5-6 *Engineer Field Manual: Operations of Engineer Field Units* (April 23, 1943), the degree to which



Engineer topographic companies were known for the superb work they performed in creating theater maps, often using photoreconnaissance images as their reference. Here Technician Third Grade James Ellis of the 660th Engineer Base Topographic Battalion lays out photographs to check their sequence in Kew Gardens, England, January 11, 1943. (US Army/Interim Archives/Getty Images)

such principles were trained and reinforced within engineer units was still variable. A high turnover of personnel due to casualties, plus the rapid influx of recruits into a swelling conscription army, meant that many soldiers went into theater on the back of abbreviated or partial training. Furthermore, a task-specific emphasis on training for engineer duties also curtailed time for pure infantry training.

Another issue was organizational, in that the shift from, say, an engineer platoon to an infantry platoon required a complete adjustment in tactical thinking and command relationships. The recommended approach was to take the engineer platoon and designate the three 13-man “operating units” as rifle squads, while also creating a machine-gun squad around the .30-caliber Browning machine gun. In an article by Stanley W. Dziuban, a lieutenant colonel in the Corps of Engineers, he noted that the main problem with this arrangement was finding the NCOs competent enough to direct the new infantry squads in their combat roles (Dziuban 1944: 402). Other issues noted by Dziuban include the lack of engineer integration into the infantry communications network and the inadequate distribution of intelligence between engineer and infantry units.

One element that helped overcome many of these problems during 1943 and certainly in 1944 was the progressive buildup of combat experience among the combat engineers, meaning that most units had experienced soldiers, NCOs, and officers within their ranks. For example, the personnel of the 540th ECR, by the time they embarked for the Anzio landing, had already conducted amphibious landings at North Africa, Licata and Gela (Sicily), and Salerno, and had experienced infantry combat ashore. For many engineers, combat insight fused with their engineering talents to make them particularly effective in some infantry roles. Engineers were quite capable tank-hunters, for example, using their know-how with demolition charges, incendiary weapons, obstacle creation, and vehicle operation to create a high-threat environment for enemy armor. Thus while the employing of engineers as infantry was not an ideal situation, they still offered a potent additional combat arm to the infantry when required.

Aftermath

The landings on Omaha Beach had been a devastating experience for the US Army combat engineers, being the costliest amphibious assault of the war in the ETO and MTO. Yet the surviving Germans still facing Omaha Beach on D+1 were not in any position to rejoice. At one point, during the late morning and early afternoon of June 6, it had looked possible that the defenders might conceivably halt the invasion, at least in this sector. Yet by daylight on June 7, Kraiss knew that without the sudden and powerful influx of reinforcements – he no longer had a substantial reserve left – he could not stem the tide. The reserve of 352. Infanterie-Division, indeed the only reserve of LXXXIV. Armeekorps, was the 2,700-strong Kampfgruppe Meyer (Grenadier-Regiment 915), led by Oberst Ernest Meyer. When the US airborne landings had first gone in during the early hours of June 6, Kraiss had sent this reserve westward toward the Vire Estuary, *away* from the beaches. He later realized his mistake and reversed the march, redirecting the battlegroup toward the beaches, sending one battalion toward the US landings and two battalions against British landings on Gold Beach. The time wasted in shuttling the battlegroup backward and forward, and Kraiss' understandable indecision about where to commit his forces, meant that the battlegroup came under the endless punishment of swelling Allied tactical air support. Thus the battalion heading for the US beaches, which should have arrived in the defenses at 0930hrs, actually did not arrive until the early afternoon, by which point the US forces were already penetrating beyond the beach. In front of Gold Beach, the British 50th Infantry Division wiped out the battlegroup in a major armored thrust – only about 90 men of the battlegroup ultimately escaped. Kraiss threw in all the remaining units he had, but none of it was enough to quash the Allied landings on that crucial first day. Thus the German forces around Omaha Beach, and the other landing zones, moved back into the Normandy countryside to begin the arduous “battle of the bocage.” Such was the intensity of the fighting that by the end



US Army engineers, laboring within the range of nearby German artillery, develop an airfield in northern France, using wire matting to lay a runway. The engineers' ability to produce such airfields in a matter of days was central to extending the reach of the tactical air forces as the Allied advance pushed on into Western Europe. (© CORBIS/Corbis via Getty Images)

of July 352. Infanterie-Division essentially did not exist, most of its troops being moved into various ad hoc battlegroups.

For the US engineers, despite their traumas, a heavily logistical workload had to be performed if the advance inland was to be powered forward. The first role of the Provisional Engineer Special Brigade Group after D-Day was to make the battle-scarred beaches fit for the round-the-clock supply chain that they were to support. Obstacles, destroyed vehicles, and bodies were removed; wire matting was laid to provide a solid surface for vehicles; mines were cleared; bulldozer crews flattened the shingle. Vast supply dumps were established in and around the beaches, with the Easy Red and Fox Red beach sectors subdivided with the addition of two new beach sectors – Easy White and Fox White – to provide additional lanes of entry and exit. The engineers also worked on the completion of the temporary “Mulberry” harbors, which provided major anchorage until a proper port could be acquired. Engineers throughout the invasion force struggled to keep up with the logistical demands; indeed, throughout June 1944 the totals landed always lagged behind the ambitious targets set. Nevertheless, by the end of June 452,460 troops had been put ashore in France as had nearly 290,000 tons of supplies and 46,000 vehicles.

In all three of the amphibious landings studied in this book, the US Army engineers were never the largest element of the forces committed. Yet their importance was utterly central to the operational outcome. Without the engineers, beachheads and bridgeheads would have been little more than battlefields, rather than steppingstones for far larger tactical and strategic gains. The German defenders resisting these invasions were ultimately unsuccessful in stopping these troops doing their critical work.

UNIT ORGANIZATIONS

American

For the US Army engineers, the core unit was the battalion, which had three main combat-engineer companies plus a Headquarters and Service Company, and prior to August 1944 had a total strength of 692 officers and men. The battalion contained within it the various specialisms to perform its multifaceted roles, including an administrative section, six-man reconnaissance section, intelligence section, supply section, and maintenance section, all of which came under the Headquarters and Service Company. The combat-engineer companies were broken down into platoons, each of which consisted of a five-man platoon headquarters plus a 39-man engineer section, itself divided into three 13-man “operating units.” Again, these companies had a mix of skills, vehicles, equipment, and intended roles contained within them.

This principle of full-spectrum engineering skills could also be scaled up by adding units onto a battalion. For example, the US 37th Engineer Combat Battalion had the following units attached to form the 37th Battalion Beach Group for D-Day in Normandy (here quoting from 5th ESB 1945: 80): 459th Amphibian Truck Company; 4141st Quartermaster Service Company; 97th Quartermaster Railhead Company; Co. A (Provisional), 61st Medical Battalion; Co. C, 6th Naval Beach Battalion; 1st Platoon, Co. A, 203d Quartermaster Gas Supply Battalion; 1st Ammunition Platoon, 616th Ordnance Ammunition Company; 2d Shop Platoon, 3466th Ordnance Medium Automotive Company; 1st Platoon, 210th Military Police Company; 1st Platoon, 30th Chemical Decontamination Company; 2d Platoon, 294th Joint Assault Signal Company; 26th Ordnance Bomb Disposal Squad; plus 398 personnel from the 348th Engineer Combat Battalion, who were to revert to their parent organization upon arrival of the Commanding Officer of the 348th Battalion Beach Group.

A mixed group of German soldiers pose for a photograph during the retreat through Normandy in July 1944. Note the apparent youth of many of the soldiers; by mid-1944 it was common for 17-year-olds to be serving on the front line. (Galerie Bilderwelt/Getty Images)

German

The German infantry division of 1944 (following significant structural revisions in 1943) was composed of three infantry regiments, each of two battalions and an antitank and howitzer company. The division also contained a fusilier battalion, an artillery regiment, a signals battalion, an antitank battalion, and a combat-engineer battalion, for a total theoretical divisional strength of about 12,350 officers and men, although in reality the manpower was often well below this figure. Firepower assets within the division included 48 8cm mortars, 28 12cm mortars, 21 7.5cm antitank guns, 42 10.5cm howitzers, and 18 7.5cm howitzers, with logistics and movement facilitated by more than 4,600 horses and 615 motor vehicles.

The other type of German division encountered in this book is the *Panzergranadier* division. The structure of this division was more complex than that of the infantry, to reflect its greater combined-arms tactical role. The heart of the division was a *Panzergranadier* brigade of two regiments, each regiment being composed of three battalions plus an artillery company, antitank company, antiaircraft company, and headquarters company. The other major on-paper units were a reconnaissance battalion, assault-gun battalion, artillery regiment, antitank battalion, antiaircraft battalion, signals battalion, and combat-engineer battalion. Total theoretical strength was just under 14,000 men, who required some 2,600 vehicles (plus 469 motorcycles) to fulfil their mechanized role. The impressive firepower (e.g. 45 assault guns and nearly 100 artillery pieces) and mobility of the *Panzergranadier-Division* was often utilized in the formation of battlegroups, various regiments, battalions, and companies being hived off to help construct an emergency formation.



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